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1986

EPA Superfund
Record of Decision:

MARATHON BATTERY CORP.
EPA ID: NYD010959757
OU 01
COLD SPRINGS, NY
09/30/1986

MARATHON BATTERY COMPANY SITE, COLD SPRING, PUTNAM COUNTY, NEW YORK.

#DR
DOCUMENTS REVIEWED:

I AM BASING MY DECISION PRIMARILY ON THE FOLLOWING DOCUMENTS DESCRIBING THE ANALYSIS OF THE COST-EFFECTIVENESS OF REMEDIAL ALTERNATIVES AT THE MARATHON BATTERY COMPANY SITE:

- REMEDIAL ACTION MASTER PLAN FOR THE MARATHON BATTERY SITE, COLD SPRING, NEW YORK, C.C. JOHNSON AND ASSOCIATES, AUGUST 1982.
- PRELIMINARY SITE BACKGROUND DATA ANALYSIS OF FOUNDRY COVE, COLD SPRING, PUTNAM COUNTY, NEW YORK, RESOURCE ENGINEERING, JULY 1983.
- MARATHON BATTERY MEMORANDUM REGARDING ARCHIVE SEARCH, PUTNAM, HAYES AND BARTLETT, JULY 1983.
- ARCHIVES SEARCH REPORT OF THE FORMER COLD SPRING, BATTERY PLANT PUTNAM COUNTY, NEW YORK, ENVIRONMENTAL SCIENCE AND ENGINEERING, AUGUST 1984.
- TECHNICAL MEMORANDUM NO. 9, SUMMARY OF HYDRAULIC MONITORING/DATA COLLECTION, MARATHON BATTERY SITE, ACRES INTERNATIONAL, FEBRUARY 1985.
- TECHNICAL MEMORANDUM NO. 7, SUMMARY OF ENVIRONMENTAL INVESTIGATIONS SEDIMENT AND WATER QUALITY MARATHON BATTERY SITE, ACRES INTERNATIONAL, MAY 1985.
- TECHNICAL MEMORANDUM NO. 8, SUMMARY OF ECOLOGICAL INVESTIGATIONS, MARATHON BATTERY SITE, ACRES INTERNATIONAL, 1985.
- DRAFT REMEDIAL INVESTIGATION REPORT, ACRES INTERNATIONAL, AUGUST 1985.
- TECHNICAL MEMORANDUM NO. 12, EVALUATION SUMMARY OFF-SITE REMEDIATION ALTERNATIVES, ACRES INTERNATIONAL, NOVEMBER 1985.
- SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT, MARATHON BATTERY COMPANY SITE, EBASCO SERVICES, INC., AUGUST 1986.
- SUPPLEMENTAL FEASIBILITY STUDY REPORT, MARATHON BATTERY COMPANY SITE, EBASCO SERVICE, INC., AUGUST 1986.
- SUMMARY OF REMEDIAL ACTION ALTERNATIVE SELECTION - MARATHON BATTERY SITE.
- RESPONSIVENESS SUMMARY.
- STAFF SUMMARIES, MEMORANDA, LETTERS, AND RECOMMENDATIONS.

#DE
DECLARATIONS:

CONSISTENT WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA), AND THE NATIONAL CONTINGENCY PLAN (40 CFR PART 300), I HAVE DETERMINED THAT THE SELECTED REMEDIAL STRATEGY FOR THE EAST FOUNDRY COVE MARSH PORTION OF THE MARATHON BATTERY COMPANY SITE IS A COST-EFFECTIVE REMEDY, AND THAT IT EFFECTIVELY MITIGATES AND MINIMIZES EXISTING AND POTENTIAL DAMAGE TO, AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE, AND THE ENVIRONMENT.

THE ACTION WILL REQUIRE THE MAINTENANCE OF THE VEGETATED MARSH TO ENSURE THE CONTINUED EFFECTIVENESS OF THE REMEDY. THE REMEDY WILL INCLUDE THIRTY YEARS OF MONITORING OF SEDIMENT TRANSPORT AND BIOTA, AS WELL.

THE REGION HAS CONSULTED WITH THE STATE OF NEW YORK IN SELECTING THE RECOMMENDED REMEDIAL ACTION FOR THIS SITE. THE STATE CONCURS THAT NO ACTION, WITH LONG-TERM MONITORING, IS APPROPRIATE FOR CONSTITUTION MARSH, AND THAT DREDGING IS THE MOST APPROPRIATE SOURCE CONTROL MEASURE FOR THE EAST FOUNDRY COVE MARSH PORTION OF THE MARATHON BATTERY COMPANY SITE.

I HAVE ALSO DETERMINED THAT THE ACTION BEING TAKEN IS APPROPRIATE WHEN BALANCED AGAINST THE AVAILABILITY OF TRUST FUND MONIES FOR USE AT OTHER SITES.

DUE TO THE UNAVAILABILITY OF SUFFICIENT CERCLA FUNDING AT THIS TIME, THE REMEDIAL DESIGN WILL COMMENCE AFTER FUNDS BECOME AVAILABLE FOLLOWING REAUTHORIZATION.

SEPTEMBER 30, 1986 CHRISTOPHER J. DAGGETT
DATE REGIONAL ADMINISTRATOR.

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
MARATHON BATTERY COMPANY SITE

#SLD
SITE LOCATION AND DESCRIPTION:

- **!** SITE LOCATION

THE MARATHON BATTERY COMPANY SITE, LOCATED IN THE VILLAGE OF COLD SPRING, PUTNAM COUNTY, NEW YORK, APPROXIMATELY 60 KILOMETERS (KM) NORTH OF NEW YORK CITY, INCLUDES THE FORMER NICKEL-CADMIUM BATTERY MANUFACTURING FACILITY AND THE SURROUNDING PLANT GROUNDS, THE HUDSON RIVER IN THE VICINITY OF THE COLD SPRING PIER, AND A SERIES OF RIVER BACKWATER AREAS KNOWN AS FOUNDRY COVE AND CONSTITUTION MARSH. (SEE FIGURES 1 AND 2.). COLD SPRING HAS A PERMANENT POPULATION OF ABOUT 2200 RESIDENTS.

- **!** SITE DESCRIPTION

LOCATED ON KEMBLE AVENUE, THE FORMER BATTERY PLANT IS CURRENTLY UTILIZED AS A BOOK WAREHOUSE. A WELL AND PUMPING STATION, AND A STEEL WATER TOWER ARE LOCATED ON THE FENCED PLANT PROPERTY. AT THE NORTHWESTERN END OF AN ASPHALT PARKING AREA LIES AN UNDERGROUND SEALED ASPHALT AND CLAY LINED VAULT WHEREIN SPOILS FROM DREDGING ACTIVITIES IN THE COVE ARE BURIED. (SEE FIGURE 3.). TWENTY-NINE HOUSES, LOCATED ON CONSTITUTION AVENUE, ARE IN THE IMMEDIATE VICINITY OF THE SITE.

A SANITARY SEWER LINE FROM THE PLANT RUNS NORTHWARDS UNDER KEMBLE AVENUE. DURING THE EARLY YEARS OF THE PLANT'S OPERATION, THIS SEWER LINE CONTINUED WESTWARD ALONG MAIN STREET, DISCHARGING INTO THE HUDSON RIVER AT THE COLD SPRING PIER. A NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT) STORM SEWER, AND A STORMWATER/INDUSTRIAL BY-PASS LINE RUNNING BY GRAVITY FROM THE FORMER BATTERY PLANT, 0.5 KM SOUTHEASTWARD UNDER KEMBLE AVENUE, DISCHARGE INTO FOUNDRY COVE.

FOUNDRY COVE, A SHALLOW BAY AND CATTAIL MARSH ON THE EAST BANK OF THE HUDSON RIVER ACROSS FROM WEST POINT, IS COMPOSED OF EAST AND WEST COMPONENTS. EAST FOUNDRY COVE IS PARTIALLY ISOLATED FROM WEST FOUNDRY COVE AND THE HUDSON RIVER BY A RAILROAD BED TO THE WEST. THE 20 HECTARE (HA) EAST FOUNDRY COVE CONSISTS OF APPROXIMATELY 5 HA OF MARSH TO WHICH THE PLANT'S OUTFALL DISCHARGED AND 15 HA OF TIDAL FLAT AND COVE. THE EXCHANGE OF WATER BETWEEN EAST FOUNDRY COVE AND WEST FOUNDRY COVE DURING FLOOD AND EBB TIDES IS THROUGH A 10 METER (M) PASSAGE UNDER A METRO-NORTH RAILROAD TRESTLE AND A CHANNEL SYSTEM WHICH CONNECTS FOUNDRY COVE TO CONSTITUTION MARSH, A 117 HA AUDUBON SOCIETY SANCTUARY TO THE SOUTH. LOCATED TO THE NORTH OF THE SITE IS THE RESIDENTIAL/BUSINESS DISTRICT OF COLD SPRING. THE EASTERN BOUNDARY OF THE SITE INCLUDES THE OLD FOUNDRY, A NATIONAL HISTORIC SITE.

WATER DEPTHS IN WEST FOUNDRY COVE AND THE HUDSON RIVER IN THE VICINITY OF THE COLD SPRING PIER RANGE FROM 0 TO ABOUT 6 M, INCREASING DRAMATICALLY WITHIN SEVERAL HUNDRED METERS OF SHORE. THE MAIN CHANNEL OF THE HUDSON RIVER IN THIS AREA AVERAGES BETWEEN 20 AND 80 M IN DEPTH. THE COLD SPRING PIER AREA IS IN AN EDDY ZONE CREATED BY THE PIER AT THE SOUTH END OF THIS AREA AND ENCOMPASSES AN AREA OF 110 M TAKEN FROM THE PIER. SIMILARLY, WEST FOUNDRY COVE IS IN AN EDDY AREA CREATED BY CONSTITUTION ISLAND. THESE SLOW FLOW EDDY AREAS HAVE A SIGNIFICANTLY HIGHER DEPOSITION OF CONTAMINANTS. WATER CIRCULATION BETWEEN FOUNDRY COVE AND THE HUDSON RIVER IS MAINLY INFLUENCED BY A TIDE OF 1 TO 1.5 M, EXPOSING A CONSIDERABLE PORTION OF THE EAST FOUNDRY COVE BOTTOM AT LOW TIDE. BECAUSE OF THE SHALLOW WATER DEPTHS IN THE COVE, ALMOST 1/3 OF THE COVE BOTTOM IS COVERED WITH AQUATIC PLANT GROWTH.

FOR THE PURPOSE OF THIS PROJECT, THE SITE IS CONSIDERED AS TWO SUB-SITES: (1) EAST FOUNDRY COVE MARSH* AND CONSTITUTION MARSH AND (2) EAST FOUNDRY COVE, WEST FOUNDRY COVE, THE HUDSON RIVER IN THE VICINITY OF THE COLD SPRING PIER, AND THE FORMER BATTERY MANUFACTURING FACILITY. THIS RECORD OF DECISION ADDRESSES THE FIRST OF THESE SUB-SITES.

- **!** EAST FOUNDRY COVE MARSH IS DEFINED AS INCLUDING THE CATTAIL MARSH, OUTFALL AREA, AND THE CHANNELS IN THE MARSH, AS WELL AS THE AREA IN EAST FOUNDRY COVE IN THE VICINITY OF THE MAIN CHANNEL OUTLET.

HYDROGEOLOGY

PUTNAM COUNTY, IN THE VICINITY OF THE MARATHON BATTERY COMPANY SITE, IS UNDERLAIN BY THIN, UNCONSOLIDATED DEPOSITS OF MAINLY GLACIAL ORIGIN, RESTING UPON CONSOLIDATED FRACTURED AND FAULTED BEDROCK OF THE PRECAMBRIAN AGE, FORMING A NORTHEASTERLY PLUNGING ANTICLINE. BEDROCK IS COMPRISED OF POCHUCK DIORITE OF IGNEOUS ORIGIN SURROUNDED BY A MASS OF IGNEOUS AND METAMORPHIC ROCKS CONSISTING CHIEFLY OF UNDIFFERENTIATED GRANITE AND GNEISS. THE OVERLYING UNCONSOLIDATED DEPOSITS ARE COMPRISED MAINLY OF TILL CONSISTING OF CLAY AND BOULDERS WITH SOME STRATIFIED DRIFT DEPOSITS OF OUTWASH SAND AND GRAVEL AND SOME SILT AND CLAY IN THE STREAM VALLEY SOUTHEAST OF COLD SPRING. THE UNCONSOLIDATED DEPOSITS RANGE IN THICKNESS FROM A FEW METERS TO 10 M IN THE AREAS SURROUNDING COLD SPRING. SOIL PERMEABILITIES RANGE FROM 4 X 10-4 TO 1 X 10-2 CENTIMETERS PER SECOND.

THE MOST IMPORTANT SOURCES OF GROUND WATER IN THE AREA ARE THE CONSOLIDATED BEDROCKS. WELL YIELDS FROM THESE ROCKS ARE LOW (LESS THAN 80 LITERS PER MINUTE (1 LPM)), HOWEVER, AND SUFFICIENT ONLY TO SUPPLY DOMESTIC, FARM AND OTHER RELATIVELY SMALL NEEDS. THE WATER IN THE CONSOLIDATED BEDROCK IS GENERALLY UNDER WATER TABLE CONDITIONS IN AREAS WHERE THE BEDROCK OUT-CROPS, OR WHERE IT IS COVERED BY RELATIVELY PERMEABLE UNCONSOLIDATED DEPOSITS. ARTESIAN CONDITIONS MAY OCCUR IN BOTH UPLAND AND LOWLAND AREAS WHERE THE BEDROCK IS OVERLAIN BY RELATIVELY IMPERMEABLE GLACIAL TILL. A STORM SEWER OUTFALL, CONSTRUCTED BY THE NYSDOT IN THE SUMMER OF 1984, DISCHARGES INTO EAST FOUNDRY COVE MARSH, SEVERAL HUNDRED METERS SOUTHEAST OF THE KEMBLE AVENUE OUTFALL.

BECAUSE OF ITS RELATIVE IMPERMEABILITY, THE GLACIAL TILL UNCONSOLIDATED DEPOSITS FOUND IN THE COLD SPRING AREA CONSTITUTE A POOR GROUND-WATER AQUIFER. THE MORE PERMEABLE GLACIAL DRIFT SAND AND GRAVEL DEPOSITS ARE LIMITED TO VALLEYS OF THE HUDSON RIVER AND ITS TRIBUTARIES. WELL YIELDS IN THESE VALLEY DEPOSITS AVERAGE 120 LPM AND RANGE AS HIGH AS 1800 LPM. THESE SAND AND GRAVEL DEPOSITS ARE THICKEST IN THE HUDSON VALLEY WHERE THEY ARE SEEMINGLY OVERLAIN BY A CLAY AND SILT LAYER THAT MAY BE MORE THAN 30 M THICK IN SOME PLACES.

IN FOUNDRY COVE, LOOSE UNCONSOLIDATED SEDIMENTS ONE METER OR LESS IN THICKNESS OVERLAY A HARD IMPERMEABLE CLAY-LIKE MATERIAL (SEE FIGURE 4 AND TABLES 1 AND 2.). GROUND-WATER FLOW IN THE SEDIMENTS IS TOWARD FOUNDRY COVE OR THE HUDSON RIVER. FLOW DIRECTION IN THE DEEPER FRACTURED ROCK IS DEPENDENT ON THE DIRECTION OF THE FRACTURE SYSTEMS BUT IS GENERALLY TOWARD THE RIVER OR THE COVE. ON-SITE, DEPTH TO GROUND WATER IS APPROXIMATELY 6 M.

SEVERAL ROCK WELLS OCCUR IN THE VICINITY OF THE SITE: (1) THE FORMER BATTERY FACILITY GROUNDS; (2) GORDON SCHOOL (3 KM TO THE SOUTHEAST); (3) WALTER HORNING HOME (4 KM TO THE SOUTHEAST); AND (4) POST ROAD MOBILE HOME PARK (4 KM TO THE NORTHEAST).

TOPOGRAPHY

THE LAND SURFACE ELEVATION AT THE FORMER BATTERY PLANT IS ABOUT 12 M ABOVE MEAN SEA LEVEL, SLOPING TOWARDS THE SOUTH TO FOUNDRY COVE AND SOUTHEAST TO THE MARSH. A TERRACE RISES MORE THAN 30 M ABOVE THE LAND SURFACE TO THE NORTHEAST. SINCE THE LAND SURFACE AT THE PLANT SITE IS CURRENTLY COVERED WITH BUILDINGS AND PAVEMENT, INFILTRATION RATES ARE LOW AND RUNOFF IS HIGH. PRECIPITATION IN THIS AREA IS COLLECTED BY THE STORM DRAINAGE SYSTEM AND DISCHARGED TO EAST FOUNDRY COVE MARSH, ULTIMATELY DISCHARGING INTO THE HUDSON RIVER.

BIOTA

PLANT SPECIES PRESENT IN FOUNDRY COVE AND CONSTITUTION MARSH INCLUDE EMERGENT TYPES GROWING IN OPEN WATER SUCH AS ARROW ARUM, PICKEREL WEED, AND CATTAIL. WATER MILFOIL, A SUBMERGENT, IS FOUND IN OPEN WATER AREAS. TYPHA AND ARROW ARUM ARE THE PREDOMINANT PLANT SPECIES EXISTING IN THE OUTFALL AREA. AN UNUSUAL CATTAIL MORPHOLOGY OF THE LOWER PORTION OF THE INFLORESCENCE WAS OBSERVED NEAR THE KEMBLE AVENUE OUTFALL (ACRES, 1985).

THE PREDOMINANT FAUNAL POPULATION OBSERVED IN AND AROUND THE FOUNDRY COVE AND CONSTITUTION MARSH AREA INCLUDE MICE, NORWAY RATS, MUSKRAT, SNAPPING TURTLES, CATFISH, BANDED KILLIFISH, SUNFISH, CARP, WHITE PERCH, EEL, PICKEREL FROGS, AND BLUE CRABS. THE DOMINANT BENTHIC ORGANISMS ARE CHIRONOMID LARVAE (DIPTERA) AND OLIGOCHAETE (SEGMENTED) WORMS. MIGRATING WATERFOWL, PREDOMINANTLY DUCKS AND GEESE, ARE PERIODICALLY PRESENT, AS WELL (ACRES, 1985).

HISTORIC SITES

A CONSIDERABLE NUMBER OF HISTORIC AREAS ARE IN THE VICINITY OF THE SITE, INCLUDING THE COLD SPRING HISTORIC DISTRICT, COMPOSED OF 31 PROPERTIES OF MAIN STREET; THE WEST POINT FOUNDRY HISTORIC DISTRICT, COVERING ALL OF EAST FOUNDRY COVE AND A PORTION OF THE FOUNDRY BROOK DRAINAGE BASIN; THE FAIR LAWN AREA, ORIGINATING NEAR THE MOUTH OF FOUNDRY BROOK AND CONTIGUOUS TO THE WEST POINT FOUNDRY AREA; THE BOSCOBEL HISTORICAL SITE, LOCATED ADJACENT TO CONSTITUTION MARSH; AND EAGLE'S REST HISTORIC AREA, INCLUDING MUCH OF THE SOUTHERN PORTION OF FOUNDRY COVE.

#SH
SITE HISTORY:

IN 1952, THE U.S. ARMY CORPS OF ENGINEERS CONSTRUCTED A BATTERY MANUFACTURING FACILITY IN THE VILLAGE OF COLD SPRING, PUTNAM COUNTY, NEW YORK, FOR THE U.S. ARMY SIGNAL SUPPLY AGENCY (REI, 1983).

IN 1953, UNDER CONTRACT WITH THE ARMY SIGNAL CORPS, SONOTONE CORPORATION BEGAN OPERATING THE PLANT TO PRODUCE NICKEL-CADMIUM BATTERIES FOR USE IN THE NIKE MISSILE PROGRAM. SUBSEQUENT CONTRACTS FOR BATTERY PRODUCTION AT THE PLANT INCLUDED BATTERIES FOR WARHEAD FAILSAFE SYSTEMS AND MILITARY JET FIGHTER BATTERIES. BETWEEN 1954 AND 1955, THE CONTRACT WAS AMENDED TO PERMIT SONOTONE CORPORATION TO PRODUCE COMMERCIAL BATTERIES (REI, 1983).

IN 1962, THE GOVERNMENT, HAVING DECLARED THE PROPERTY EXCESS, SOLD IT TO SONOTONE CORPORATION. IN 1967, SONOTONE CORPORATION BECAME A WHOLLY-OWNED SUBSIDIARY OF CLEVITE CORPORATION. IN 1969, CLEVITE CORPORATION MERGED WITH GOULD, INCORPORATED. IN 1969, GOULD, INCORPORATED SOLD THE PLANT TO BUSINESS FUND, INCORPORATED WHICH LATER CHANGED ITS NAME TO MARATHON BATTERY COMPANY. MARATHON BATTERY COMPANY OPERATED THE PLANT UNTIL MARCH 1979. THE PLANT WAS INACTIVE FROM MARCH 1979 UNTIL NOVEMBER 1980, WHEN IT WAS SOLD TO THE CURRENT OWNER, MERCHANDISE DYNAMICS, INCORPORATED, FOR USE AS A BOOK STORAGE FACILITY. PRIOR TO SELLING THE PLANT TO MERCHANDISE DYNAMICS, INCORPORATED, ALL BATTERY MANUFACTURING EQUIPMENT WAS REMOVED AND SHIPPED TO A MARATHON BATTERY COMPANY PLANT IN WACO, TEXAS, AND APPROXIMATELY 225,000 KG OF DRUMMED PROCESS WASTES WERE SHIPPED TO PRECIOUS METALS REFINING CORPORATION IN HOLLYWOOD, CALIFORNIA FOR REFINING AND RECYCLING (REI, 1983).

THE PLANT'S ORIGINAL WASTEWATER TREATMENT SYSTEM CONSISTED OF A LIFT STATION AND PIPING FOR TRANSFER OF ALL PROCESS WASTEWATER INTO THE COLD SPRING SEWER SYSTEM FOR DISCHARGE DIRECTLY INTO THE HUDSON RIVER. IN ADDITION, A BY-PASS VALVE WAS INSTALLED SO THAT WHEN THE LIFT STATION WAS SHUT DOWN OR OVERLOADED, A DIRECT GRAVITY DISCHARGE COULD BE MADE INTO A STORM SEWER FOR DISCHARGE INTO EAST FOUNDRY COVE MARSH. BY-PASSES INTO THIS STORM SEWER SYSTEM WERE FREQUENTLY NECESSARY BECAUSE THE HIGH DISSOLVED SOLIDS AND PH OF THE EFFLUENT RESULTED IN EXTREME FOULING WITHIN THE PUMP AND PIPING, AS WELL AS EROSION OF THE PUMP AND IMPELLER CASE. AS THE CAPACITY OF THE PUMP WAS REDUCED BY THESE EFFECTS, THE PUMP COULD NOT HANDLE THE WASTEWATER FLOW, AND ULTIMATELY, THE PUMPS REQUIRED SHUT DOWN AND MAINTENANCE OR REPLACEMENT. TO ACCOMMODATE PEAK FLOWS, AND DURING PUMP MAINTENANCE, THE BY-PASS VALVE WAS OPENED AND THE FLOW DIVERTED TO EAST FOUNDRY COVE MARSH. THIS OCCURRED AT LEAST TWICE WEEKLY FOR PERIODS OF TIME RANGING FROM A FEW HOURS TO A FULL OPERATING SHIFT. CALCULATIONS BY CONSULTANTS FOR MARATHON BATTERY COMPANY HAVE INDICATED THAT APPROXIMATELY 50,000 KG OF CADMIUM MAY HAVE BEEN DISCHARGED TO THE COVE DURING THE LIFE OF THE PLANT (REI, 1983).

DURING 1965, THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) IDENTIFIED THE NEED FOR A SEWAGE TREATMENT PLANT IN THE VILLAGE OF COLD SPRING. DURING THE DESIGN OF THE SEWAGE TREATMENT FACILITY, THE VILLAGE'S CONSULTANT CONCLUDED THAT THE BATTERY PLANT'S PROCESS EFFLUENT COULD NOT BE MANAGED BY THE PROPOSED SEWAGE TREATMENT SYSTEM. SUBSEQUENTLY, THE VILLAGE OF COLD SPRING ORDERED SONOTONE CORPORATION TO DISCONNECT ITS INDUSTRIAL DISCHARGE FROM THE VILLAGE'S SANITARY SEWER. TO ACCOMPLISH THIS DIRECTIVE, SONOTONE SHUT DOWN THE DIVERSION PUMPS AND BY-PASSED THE ENTIRE WASTEWATER FLOW INTO THE STORM SEWER TO EAST FOUNDRY COVE MARSH. SONOTONE THEN INSTALLED EQUIPMENT WHICH WAS DESIGNED TO PRECIPITATE METAL HYDROXIDES AND ADJUST THE PH OF THE WASTEWATER PRIOR TO DISCHARGE INTO THE STORM SEWER SYSTEM. THIS TREATMENT SYSTEM, HOWEVER, FAILED TO OPERATE PROPERLY. AS A RESULT, THE TREATED WASTEWATER FAILED TO MEET STATE DISCHARGE REGULATIONS, AND THE PLANT WAS GIVEN A JANUARY 1, 1970 DEADLINE TO ACHIEVE COMPLIANCE WITH DISCHARGE REGULATIONS (REI, 1983).

PURSUANT TO THE FINAL JUDGMENT IN 70 CIV. 4110, DISCUSSED IN THE ENFORCEMENT SECTION, HYDRAULIC DREDGING WAS CONDUCTED BETWEEN SEPTEMBER 1972 AND JULY 1973. FIGURE 5 ILLUSTRATES THE EXTENT OF THE DREDGING OPERATION. THE OUTFALL AREA WAS DREDGED TO A DEPTH OF 0.6 M AT WHICH POINT A SOLID CLAY-GRAVEL BASE WAS ENCOUNTERED. THE BASE, FOUND TO BE RELATIVELY CONTAMINANT FREE, WAS NOT REMOVED. THE CHANNEL WAS DREDGED TO A DEPTH

VARYING FROM 0.6-1.2 M AND 90,000 SQUARE METERS (M2), 0.3 M DEEP AREA WAS REMOVED FROM THE MAIN BODY OF THE COVE. ALL DREDGE SPOILS WERE DEPOSITED IN A DIKED ENCLOSURE CONSTRUCTED OVER A PARKING LOT ON THE BATTERY FACILITY PROPERTY. APPROXIMATELY 4,000 CUBIC METERS (M3) OF MATERIAL WERE EVENTUALLY RETAINED. DURING THE DEWATERING PROCESS, THE SEDIMENTS WERE ALLOWED TO SETTLE OVERNIGHT. THE NEXT MORNING, THE SUPERNATANT PASSED THROUGH A STORM DRAIN AND BACK INTO FOUNDRY COVE (GREGOR, 1973).

AFTER COMPLETION OF THE DREDGING OPERATION, THE DEWATERED DREDGE SPOILS, WERE PLACED IN A CLAY-LINED UNDERGROUND VAULT ON THE PLANT PROPERTY. THE VAULT WAS THEN SEALED WITH ASPHALT AND FENCED.

VARIOUS STUDIES BY NEW YORK UNIVERSITY (NYU) AND OTHERS WERE CONDUCTED ON THE FOUNDRY COVE CADMIUM CONTAMINATION PROBLEM PRIOR TO, DURING, AND AFTER THE DREDGING ACTIVITIES. POST-DREDGING MONITORING CONTINUED TO DETECT ELEVATED CADMIUM AND NICKEL CONCENTRATIONS IN THE COVE'S SEDIMENTS, FLORA, AND FAUNA.

IN OCTOBER 1981, EPA LISTED THE MARATHON BATTERY COMPANY SITE ON THE NATIONAL PRIORITIES LIST.

IN AUGUST 1983, EPA AND THE STATE OF NEW YORK SIGNED A COOPERATIVE AGREEMENT TO UNDERTAKE A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) FOR THE MARATHON BATTERY COMPANY SITE. ACRES INTERNATIONAL, THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CONSULTANT, INITIATED THE RI/FS COVERED BY THE COOPERATIVE AGREEMENT IN MAY 1984.

AN RI REPORT ON THE NATURE AND EXTENT OF THE CONTAMINATION OF THE FOUNDRY COVE/HUDSON RIVER PORTION OF THE SITE WAS COMPLETED IN JULY 1985. A DRAFT FS FOR THIS PORTION OF THIS SITE WAS COMPLETED IN AUGUST 1985. BECAUSE THE FS CONTAINED INSUFFICIENT INFORMATION TO EVALUATE EFFECTIVELY THE TECHNICAL MERITS AND ENVIRONMENTAL EFFECTS OF THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION, THE U.S. ARMY CORPS OF ENGINEERS (COE) WAS TASKED TO EXPAND UPON THE STUDY BY FURTHER EVALUATING TECHNICALLY FEASIBLE MEANS OF REMEDIATING FOUNDRY COVE AND CONSTITUTION MARSH, INCLUDING IDENTIFYING AND EVALUATING EFFECTIVE MEANS OF CONTAINING THE SITE'S CADMIUM-CONTAMINATED SEDIMENTS, EVALUATING THE EFFECTIVENESS AND EFFICIENCIES OF SITE-WIDE AND HOT SPOT DREDGING, AND DETERMINING THE LONG-TERM HYDRAULIC IMPACTS ON CONSTITUTION MARSH ASSOCIATED WITH DREDGING AND/OR CONTAINING THE CONTAMINATED SEDIMENTS IN FOUNDRY COVE. THE COE COMPLETED ITS TECHNICAL ASSISTANCE IN FEBRUARY 1986. IN ADDITION, SOME ADDITIONAL RI/FS ACTIVITIES WERE PERFORMED BY EPA ZONE CONTRACTOR, EBASCO SERVICES, INCORPORATED. THESE ACTIVITIES INCLUDED BENCH TOP TESTING OF HEAVY METAL TREATMENT TECHNOLOGIES; ADDITIONAL SEDIMENT CORINGS IN CONSTITUTION MARSH; A WETLAND ASSESSMENT, AND INTERPRETATION AND INCORPORATION OF THE COE'S TECHNICAL ASSISTANCE INPUT, AND THE RESULTS OF THE BENCH TOP TESTING, SEDIMENT CORINGS, AND WETLAND ASSESSMENT, INTO A SUPPLEMENTAL RI/FS. THIS WORK WAS COMPLETED IN AUGUST 1986.

#CSS
CURRENT SITE STATUS:

SEDIMENTS AND SURFACE WATER ARE THE TWO POTENTIAL ROUTES OF EXPOSURE ASSOCIATED WITH THE EAST FOUNDRY COVE MARSH/CONSTITUTION MARSH PORTION OF THE MARATHON BATTERY COMPANY SITE.

- SEDIMENTS

ASSESSMENT OF THE SEDIMENTS FOCUSED ON IDENTIFYING THE DEGREE OF SEDIMENT CONTAMINATION IN TERMS OF LOCATION AND DEPTH.

TABLES 3 AND 4 SUMMARIZE THE CADMIUM, COBALT AND NICKEL CONCENTRATIONS DETECTED IN THE SEDIMENTS OF EACH OF THE AREAS SAMPLED. FIGURES 6, 7, AND 8 ILLUSTRATE THE MEAN SEDIMENT CONCENTRATION FOR EACH OF THESE AREAS. THE AREAL EXTENT OF THE CADMIUM CONTAMINATION IN EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH ARE ILLUSTRATED ON FIGURE 9. METALS CONTAMINATION IN THE SEDIMENTS DISPLAYED VERY PERCEPTIBLE PATTERNS, REFLECTING THE ORIGINAL POINT SOURCE DISCHARGE OF THE CADMIUM, NICKEL, AND COBALT INTO FOUNDRY COVE, THEIR SUBSEQUENT TRANSPORT, AND THEIR GRADUALLY DECREASING LEVELS AT SITES PROGRESSING AWAY FROM THE DISCHARGE POINT. IN GENERAL, THE DATA SHOW THAT SEDIMENTS OF EAST FOUNDRY COVE MARSH AND THE NORTHERN PROXIMITY OF CONSTITUTION MARSH ARE CONTAMINATED RELATIVE TO TIVOLI BAY, THE CONTROL SITE, (ACRES, 1985 AND EBASCO RI, 1986).

THE HIGHEST LEVEL OF CONTAMINATION OCCURS IN EAST FOUNDRY COVE MARSH IN CLOSE PROXIMITY TO THE KEMBLE AVENUE

OUTFALL. THIS AREA IS CHARACTERIZED BY A LAYER OF GREENISH-WHITE SEDIMENT SPANNING AN APPROXIMATELY 15 BY 30 M AREA. CONTAMINANT CONCENTRATIONS IN THE EAST FOUNDRY COVE MARSH OUTFALL AREA WERE AS HIGH AS 171,000, 156,000, AND 6,700 MG/KG FOR CADMIUM, NICKEL, AND COBALT, RESPECTIVELY, TO DEPTHS GREATER THAN 50 CM (ACRES, 1983).

SEDIMENT CONTAMINATION RADIATES AWAY FROM THE EAST FOUNDRY COVE MARSH OUTFALL ALONG A PATTERN THAT FOLLOWS THE CHANNEL CONNECTING EAST FOUNDRY COVE MARSH TO THE MAIN BODY OF EAST FOUNDRY COVE. LEVELS OF CADMIUM IN THE SURFICIAL SEDIMENTS OF THIS CHANNEL AND AT ITS MOUTH RANGE BETWEEN 1,000-10,000+ MG/KG. OVERALL, THE CADMIUM CONCENTRATION MEASURED IN THE SEDIMENT DECREASED BY FOUR ORDERS OF MAGNITUDE AT INCREASED DISTANCES FROM THE OUTFALL (BOWER, 1978).

SOUTHEAST OF THE CHANNEL MOUTH IS AN AREA IN EAST FOUNDRY COVE MARSH APPROXIMATELY 75 BY 15 M CONTAINING INCREASED LEVELS OF CADMIUM UP TO 40,000 MG/KG. THE DISTRIBUTION OF THE CADMIUM IN THIS AREA, AS WELL AS WITHIN THE REMAINDER OF EAST FOUNDRY COVE APPEARS TO BE DICTATED BY: (1) THE TENDENCY OF THE FLOODING TIDAL PATTERNS, BRINGING WATER IN FROM THE HUDSON RIVER AND WEST FOUNDRY COVE, TO FOLLOW THE NORTH SHORE; (2) THE TENDENCY OF THE EBBING TIDAL PATTERNS, REMOVING WATER AND ANY ASSOCIATED CONTAMINANTS FROM EAST FOUNDRY COVE, TO FOLLOW THE SOUTH SHORE; (3) THE 1972-1973 DREDGING EFFORT ALONG THE NORTH SHORE OF THE MARSH; AND (4) THE PRESENCE OF AQUATIC VEGETATION IN SHALLOWER AREAS WHICH CONTRIBUTE TO DEPOSITION IN THESE AREAS (ACRES, 1985).

THE NORTHWESTERN SHORE CONTAINS CADMIUM CONCENTRATIONS WHICH APPROACH BACKGROUND LEVELS * AT ALL DEPTHS. SITES INVESTIGATED ALONG THE SOUTH SHORE DISPLAYED SURFICIAL CADMIUM AT CONCENTRATIONS IN THE 100-500 MG/KG RANGE. AT DEPTH, BACKGROUND LEVELS ARE OBSERVED. THE CENTRAL PORTION OF EAST FOUNDRY COVE, WHICH IS GENERALLY SHALLOWER AND TENDS TO BE DOMINATED BY ROOTED EMERGENT VEGETATION DURING THE SUMMER MONTHS, EXHIBITED SURFICIAL CADMIUM CONCENTRATIONS OF 500-1,000 MG/KG. CONTAMINATION AT DEPTH DOES NOT EXIST AT THIS LOCATION, EITHER (ACRES, 1985).

- BACKGROUND CADMIUM CONCENTRATIONS IN THE HUDSON RIVER ESTUARY HAS SHOWN WIDE SPECIAL VARIABILITY RANGING FROM 1.94 MG/KG TO 14.1 MG/KG (KNEIP AND O'CONNOR 1979, AND O'CONNOR AND MOESE, 1984) WITH A MEAN CONCENTRATION OF APPROXIMATELY 10 MG/KG.

AS CAN BE SEEN BY TABLE 4, IN CONSTITUTION MARSH CONTAMINATION IS PRESENT IN THE SURFICIAL SEDIMENTS OF THE MAIN CHANNELS IN THE NORTHERN SECTION OF THE MARSH, WITH 40% OF THE MARSH SEDIMENTS SHOWING CADMIUM AND NICKEL CONCENTRATIONS GREATER THAN 100 MG/KG TO 10 CM DEEP. OVERALL, LEVELS OF CADMIUM RANGE FROM 4.0 TO 940 MG/KG, NICKEL CONCENTRATIONS RANGE FROM 9 TO 1600 MG/KG, COBALT CONCENTRATIONS RANGE FROM 4 TO 99 MG/KG (ACRES, 1985 AND EBASCO RI, 1986).

IN THE SOUTHERN CHANNELS OF CONSTITUTION MARSH, SURFICIAL CADMIUM CONCENTRATIONS ARE STATISTICALLY SIGNIFICANT WHEN COMPARED TO THE CONTROL SITE, BUT ARE MUCH REDUCED FROM THE LEVELS OBSERVED IN THE NORTHERN CHANNELS OF THE MARSH. THE NATURE OF THE TIDAL PATTERNS IN THE MARSH, WHICH ORIGINATE FROM THE EASTERN AND SOUTHERN PORTIONS OF FOUNDRY COVE AND MEET AT THE MIDDLE OF THE MARSH, APPEAR TO LIMIT THE OPPORTUNITY FOR CONTAMINANT TRANSPORT TO THE SOUTHERN REACHES OF THE MARSH. SUBSURFACE STRATA AT ALL STATIONS REFLECT BACKGROUND CONDITIONS (ACRES, 1985).

NO FEDERAL OR STATE STANDARDS OR CRITERIA HAVE BEEN ESTABLISHED FOR CADMIUM, NICKEL, OR COBALT IN SEDIMENTS. THEREFORE, AFTER CAREFUL ANALYSIS OF SCIENTIFIC RESEARCH, PRIOR INVESTIGATIVE WORK AT THE SITE, AND THE PREVIOUS DREDGING OF THE OUTFALL AND CHANNEL TO 900 MG/KG, 100 MG/KG WAS SELECTED FOR REMEDIATION OF THE SITE. (SEE ALTERNATIVES EVALUATION SECTION FOR FURTHER DISCUSSION OF THE SELECTION OF THIS ACTION LEVEL.).

SURFACE WATER

EQUILIBRIUM CHEMISTRY STUDIES OF CADMIUM AND NICKEL, HAVE SHOWN NICKEL TO BE MORE MOBILE THAN CADMIUM (BONDIETTI ET. AL., 1974). CADMIUM TENDS TO BE ASSOCIATED WITH CARBONATES WHEREAS NICKEL IS USUALLY ASSOCIATED WITH IRON AND MANGANESE OXIDES, BUT THE PRESENCE OF LIGANDS AND ORGANIC MATERIAL CAN AFFECT THESE ASSOCIATIONS (MOORE AND RAMAMOORTHY, 1984). BOTH METALS HAVE BEEN SHOWN TO BE READILY ADSORBED BY PLANT DETRITUS (ODUM AND DRIFMEYER, 1978). IN ADDITION, SALINITY AND PH CAN EXERT STRONG EFFECTS ON THE EQUILIBRIUM CHEMISTRY OF CADMIUM AND NICKEL (HAZEN AND KNEIP, 1976).

FIGURES 10, 11, AND 12 ILLUSTRATE THE TOTAL AND SOLUBLE CADMIUM, COBALT, AND NICKEL CONCENTRATIONS IN THE SURFACE WATER. SINCE THE CADMIUM IS IN A FORM THAT IS HIGHLY AVAILABLE IN EAST FOUNDRY COVE MARSH (SLOAN, 1986), CADMIUM LEVELS IN EAST FOUNDRY COVE AS HIGH AS 0.27 MG/L HAVE BEEN DETECTED. AT SOME EAST FOUNDRY COVE STATIONS, EPA WATER QUALITY CRITERIA FOR PROTECTION OF FRESHWATER AQUATIC LIFE FROM TOXIC CONDITIONS HAVE BEEN EXCEEDED. THESE STANDARDS FOR TOTAL CADMIUM WATER CONCENTRATIONS ARE 6.6 X 10-4 TO 2.0 X 10-3 MG/L FOR WATER HARDNESS LEVELS OF 50 AND 200 MG/L, RESPECTIVELY. (LEVELS OF HARDNESS PRESENT AT THE SITE RANGE FROM 100-150 MG/L.).

THE ELEVATED LEVELS OF CADMIUM IN EAST FOUNDRY COVE ON AN EBB TIDE VERSUS A FLOOD TIDE INDICATE THAT TIDAL RESUSPENSION AND TRANSPORT OF SEDIMENTS IS OCCURRING (ACRES, 1985). (SEE TABLE 5.). IT APPEARS THAT UNDER NORMAL HYDROLOGIC EVENTS, HOWEVER, THE EXTENT OF THIS TRANSFER IS MINIMAL.

BASED ON THE FEDERAL NICKEL WATER QUALITY CRITERIA FOR THE PROTECTION OF AQUATIC LIFE, THE LEVELS OF NICKEL FOUND WILL NOT HARM THE AQUATIC BIOTA. NO STANDARDS OR CRITERIA HAVE BEEN ESTABLISHED FOR COBALT.

THE SEWER SYSTEM WHICH CARRIED THE INDUSTRIAL WASTES TO EAST FOUNDRY COVE MARSH DOES NOT APPEAR TO BE A CONTINUING SOURCE OF CONTAMINATION. NO SEDIMENT WAS FOUND IN THE SECTION OF THE KEMBLE AVENUE LINE DOWNGRADIENT OF THE FORMER BATTERY PLANT. IT APPEARS THAT FLUSHING OR SCOURING AS A RESULT OF STORM FLOW MAINTAINS THE ACCESSIBLE PORTION OF THE KEMBLE AVENUE LINE RELATIVELY FREE OF ACCUMULATED SEDIMENTS. IN ADDITION, THIS LINE WAS HYDRAULICALLY FLUSHED IN THE EARLY 1970S DURING THE DREDGING OF THE OUTFALL AREA (ACRES, 1985).

A VOLATILE ORGANIC SCAN FAILED TO DETECT THE PRESENCE OF ANY VOLATILE ORGANIC ACIDS FOR ANY WATER OR SEDIMENT SAMPLES. ORGANIC PRIORITY POLLUTANT ANALYSIS OF SEDIMENTS COLLECTED SHOW THE PRESENCE OF SOME BASE/NEUTRAL COMPOUNDS. NONE OF THE DETECTED CONTAMINANTS WERE CHLORINATED. THE BASE/NEUTRALS MEASURED IN APPRECIABLE QUANTITIES ARE TYPICALLY ASSOCIATED WITH RUNOFF FROM PAVED AREAS. ALTHOUGH ELEVATED IN RELATION TO THE OTHER SAMPLED AREAS, THE OBSERVED CONCENTRATIONS ARE NOT EXCESSIVELY HIGH. (SEE TABLE 6.).

A NUMBER OF HYDROLOGICAL PHENOMENA ASSOCIATED WITH OBSERVED FLOW PATTERNS AND TIDES APPEAR TO BE RESPONSIBLE FOR THE DISTRIBUTION OF CONTAMINANTS IN EAST FOUNDRY COVE. SEDIMENT ANALYSIS CONFIRMS THAT THERE HAS BEEN TRANSPORT OF CADMIUM, NICKEL, AND COBALT AWAY FROM THE SITE OF DEPOSITION, RESULTING IN CONTAMINATION OF PERIPHERAL AREAS. THE DATA FURTHER SHOW THAT THE DEGREE OF CONTAMINATION RADIATES FROM THE EAST FOUNDRY COVE MARSH OUTFALL AREA, SUCH THAT THOSE SITES PROGRESSIVELY DISTANT FROM THE OUTFALL ARE LESS CONTAMINATED. THE PATTERN OF CONTAMINATION IN FOUNDRY COVE IS VERY SIMILAR TO THE PATTERNS OF HYDRODYNAMIC FLOW. HIGH ENERGY AREAS TEND TO BE LESS CONTAMINATED THAN THOSE SITES WHERE THE SETTLING OF PARTICULATES IS ENHANCED AS A RESULT OF LOW VELOCITIES AND DENSE STANDS OF AQUATIC MACROPHYTES. CONTAMINANTS IN FOUNDRY COVE ARE BEING REDISTRIBUTED AND ARE NOW PRESENT OVER A WIDER AREA AND AT GREATER DEPTHS THAN DOCUMENTED IN 1972-1976 BY KNEIP. TIDAL ACTION REDISTRIBUTION OF CADMIUM FROM CONTAMINATED UNDREDGED AREAS MAY HAVE INFLUENCED EXISTING PATTERNS OF CONTAMINATION (ACRES, 1985 AND EBASCO RI, 1986).

DAILY TIDAL FLUCTUATIONS AND THE RESULTING CURRENT VELOCITIES, PERIODICALLY COMBINED WITH SIGNIFICANT RUNOFF IN FLOW FROM THE KEMBLE AVENUE AND NYSDOT OUTFALLS, ACCOUNT FOR THE PRIMARY SHORT-TERM SEDIMENT TRANSPORT MECHANISM. THE RELATIVE MOVEMENT OF SEDIMENT IS DEPENDENT ON THE TIDAL STAGE FLUCTUATION MAGNITUDE AND THE RESULTING STRENGTH OF THE EBB AND FLOOD CURRENTS. SOME OF THE RECONTAMINATION MIGHT ALSO BE THE RESULT OF MARSH BANK EROSION AND THE SUBSEQUENT FILLING OF THE CHANNEL. THE DISCHARGE OF WATERS BACK INTO FOUNDRY COVE DURING THE INITIAL DREDGE SPOIL DEWATERING OPERATIONS MAY HAVE ALSO REINTRODUCED CONTAMINATED SEDIMENTS TO THE COVE (ACRES, 1985).

CONSTITUTION MARSH IS INFLUENCED BY THE FLOW OF WATER FROM BOTH EAST FOUNDRY COVE AND SOUTH COVE. THE HYDRODYNAMICS OF TIDAL FLUX IN CONSTITUTION MARSH IS SUCH THAT THOSE STATIONS WHICH ARE PRIMARILY SUBJECTED TO WATER MOVEMENT FROM EAST FOUNDRY COVE DISPLAY A HIGHER DEGREE OF METAL CONTAMINATION THAN THOSE INFLUENCED BY SOUTH COVE TIDAL ACTIVITIES. THE TRANSPORT OF CONTAMINATED MATERIAL INTO SOUTH COVE APPEARS LIMITED (ACRES, 1985).

BIOTA CONTAMINATION

THE DEGREE OF THE CADMIUM CONTAMINATION PRESENT IN THE BIOTA IN THE FOUNDRY COVE AREA IS A CLEAR INDICATION

OF THE ENVIRONMENTAL THREAT POSED BY THE SITE.

PRACTICALLY EVERY TROPHIC GROUP SAMPLED HAD ELEVATED TISSUE BURDENS OF CADMIUM. THOSE ORGANISMS AND PLANT SAMPLES FROM THE OUTFALL AREA TYPICALLY DISPLAYED ELEVATED COBALT AND NICKEL CONCENTRATIONS AS WELL. THOSE SPECIES IN DIRECT CONTACT WITH THE CONTAMINATED SUBSTRATE, INCLUDING BENTHOS, TERRESTRIAL OLIGOCHAETES, AND WETLAND VEGETATION, OR THOSE SPECIES WITH AN EXTENDED DURATION OF EXPOSURE, INCLUDING MACROINVERTEBRATES, FISH, WOOD DUCKS, AND MAMMALS, DISPLAY THE GREATEST AMOUNT OF METAL ACCUMULATION (ACRES, 1985). (SEE FIGURES 13-20.).

THE WETLAND VEGETATION IN THE EAST FOUNDRY COVE MARSH OUTFALL AREA IS HIGHLY CONTAMINATED, WITH AVERAGE CADMIUM, NICKEL, AND COBALT CONCENTRATIONS IN THE ROOTS OF 500, 250, AND 10 UG/L, RESPECTIVELY. SIGNIFICANT LEVELS OF HEAVY METALS CONTAMINATION ALSO OCCUR IN CONSTITUTION MARSH. THE PRESENCE OF EXCESSIVE CADMIUM IN THE TISSUES OF THESE PLANTS, PARTICULARLY TYPHA, IS ECOLOGICALLY SIGNIFICANT. VEGETATION SERVES AN IMPORTANT ROLE IN THE TROPHIC PATHWAYS OF THE MARSH ECOSYSTEM. INCORPORATION OF METALS IN THE TISSUES OF THE VEGETATION MAY LEAD TO BIOACCUMULATION IN MAMMALS (ERICKSON, 1983) AND WATERFOWL (DIGIULIO, 1982). ACTING AS AN ENVIRONMENTAL SINK, THE DETRITUS BECOMES INCORPORATED IN THE SEDIMENT AND PROVIDES A MEDIUM FOR BACTERIA AND A FOOD SOURCE FOR THE BENTHIC INFAUNA (ACRES, 1985).

INFRARED AERIAL PHOTOGRAPHS WERE EXAMINED FOR EVIDENCE OF POTENTIAL VEGETATION COMMUNITY STRESS. ALTHOUGH PARTICULAR ATTENTION WAS PAID TO SECTIONS OF THE MARSH WHERE ELEVATED SEDIMENT CONTAMINANT LEVELS HAD BEEN DOCUMENTED, NO OBVIOUS PATTERNS OF STRESSED VEGETATION WERE REVEALED (ACRES, 1985).

NO SIGNIFICANT RELATIONSHIP BETWEEN BENTHIC INFAUNAL COMMUNITY STRUCTURES AND METAL CONTAMINATION LEVELS IN THE SEDIMENT HAS BEEN FOUND. WITH THE POSSIBLE EXCEPTION OF VARIATION IN COMMUNITY PATTERNS WITHIN FOUNDRY COVE, THE VARIATION IN ABUNDANCES AND DIVERSITY OF THE BENTHIC INFAUNAL COMMUNITY MAY RELATE TO DIVERSITY IN THE FORMS OF CONTAMINATION PRESENT AND THE ALTERATIONS WHICH OCCUR WITH CHANGES IN HARDNESS, PH, SALINITY, AND OTHER VARIABLES (SLOAN, 1986).

ORGANISMS WHICH ARE PART OF THE DETRITAL FOOD WEB SUCH AS FISH, MACROINVERTEBRATES, AND SOME WADING BIRDS AND WATERFOWL MAY UPTAKE THE CONTAMINANTS THROUGH INGESTION. TABLE 7 SHOWS THE LEVELS OF CONTAMINATION IN BENTHIC INFAUNA AND THE CORRESPONDING SEDIMENT CONCENTRATIONS. THE HIGHEST CADMIUM CONCENTRATION, 570 UG/L, FOUND IN THE INFAUNA IN THE VICINITY OF THE EAST FOUNDRY COVE MARSH OUTFALL, CORRESPONDS TO 5,100 UG/L IN THE SEDIMENT. A BENTHIC ALGAE SAMPLE IN THIS AREA SHOWED CONCENTRATION OF 2,840 UG/L, 2,200 UG/L, AND 120 UG/L FOR CADMIUM, NICKEL, AND COBALT, RESPECTIVELY. CADMIUM LEVELS IN FOUNDRY COVE PHYTOPLANKTON AND ZOOPLANKTON WERE AS HIGH AS 540 UG/G AND 870 UG/G, RESPECTIVELY. (ACRES, 1985) (SEE TABLE 8.).

THE DATA INDICATE THAT FISH FROM THE FOUNDRY COVE/CONSTITUTION MARSH AREA HAVE ELEVATED LEVELS OF TISSUE CONTAMINATION. THE OCCURRENCE OF ELEVATED LEVELS OF CADMIUM IN CERTAIN TISSUES OF MORONE AMERICANA (WHITE PERCH) IS NOTEWORTHY. ALTHOUGH THE FLESH WAS FOUND TO BE CONTAMINATED AT LEVELS EQUAL TO OR BELOW 0.32 UG/G, LIVER CONCENTRATIONS AS HIGH AS 47 UG/G WERE DETECTED. (SEE TABLE 9.). IT IS DIFFICULT TO CONCLUDE THAT THIS CONTAMINATION IS SOLELY THE RESULT OF EXPOSURE TO FOUNDRY COVE, AS FISH ARE HIGHLY MOBILE. THE BIOACCUMULATION STUDY REVEALED, HOWEVER, THAT SIGNIFICANT BODY TISSUE UPTAKE OF CADMIUM OCCURS EVEN UNDER A LIMITED DURATION OF EXPOSURE (ACRES, 1985).

CADMIUM CONTAMINATION OF THE MACROINVERTEBRATES (BLUE CRAB) IS RECOGNIZED AS A WIDESCALE PROBLEM IN THE HUDSON RIVER (AXELROD AND FLACKE, 1981). FOUNDRY COVE HAS BEEN IDENTIFIED AS ONE OF THE MORE IMPORTANT SOURCES OF SUCH CONTAMINATION (KUZIA, 1981). THE BIOACCUMULATION STUDY CONDUCTED BY ACRES DOCUMENTED A RAPID AND SIGNIFICANT ACCUMULATION OF CADMIUM IN THE TISSUES OF CRUSTACEANS (CRAYFISH) EVEN OVER A LIMITED PERIOD OF EXPOSURE. ALTHOUGH THE BLUE CRAB REMAINS IN THE FOUNDRY COVE AREA FOR ONLY A SHORT TIME, IT APPEARS TO BE SUSCEPTIBLE TO CADMIUM ACCUMULATION DURING THIS BRIEF EXPOSURE. TABLE 10 SHOWS AN AVERAGE CONCENTRATION OF 19.4 UG/G HEPATIC CADMIUM IN EAST FOUNDRY COVE BLUE CRAB SAMPLES.

CADMIUM LEVELS IN REPTILES (SNAPPING TURTLES) FROM FOUNDRY COVE AND CONSTITUTION MARSH WERE ELEVATED FOR KIDNEYS AND LIVER AT 27 UG/G AND 23 UG/G, RESPECTIVELY. (SEE TABLE 10.). SOME OF THE TURTLES EXAMINED WERE FOUND TO HAVE LIVER OR KIDNEY ABNORMALITIES, SUGGESTING SUB-LETHAL EFFECTS RELATED TO THE ELEVATED LEVELS OF CADMIUM. THE MUSCLE TISSUE OF THE SNAPPING TURTLES, HOWEVER, DID NOT EXHIBIT CONTAMINANT LEVELS ANY HIGHER THAN THOSE FROM TIVOLI BAY (ACRES, 1985).

THE MAMMALS, AS REPRESENTED BY MICE, RATS, AND MUSKRATS CONTAINED SIGNIFICANT LEVELS OF CADMIUM IN SPECIMENS FROM FOUNDRY COVE. IT IS SUSPECTED THAT THE MUSKRAT POPULATION OF FOUNDRY COVE/CONSTITUTION MARSH HAVE EXPERIENCED LIMITED REPRODUCTIVE SUCCESS. LODGES, BUILT IN EARLY SPRING, HAVE BEEN FOUND ABANDONED AND LACKING KITS. THE CONSUMPTION OF CADMIUM-CONTAMINATED TYPHA, AN IMPORTANT FORAGE ITEM OF MUSKRATS, LEADS TO THE ACCUMULATION OF THE METAL IN THE MUSKRATS AND MAY ELICIT SUB-LETHAL IMPACTS SUCH AS REPRODUCTIVE FAILURE (ROD, 1986).

THE RATS AND MICE EXAMINED FROM FOUNDRY COVE AND THE ADJACENT UPLAND AREAS, DISPLAYED ELEVATED CADMIUM CONTAMINATION WITH LEVELS IN ONE RAT REACHING 270 UG/G IN THE LIVER AND 210 UG/G IN THE KIDNEY. (SEE TABLE 10.). SOME OF THE LIVERS EXAMINED WERE FOUND TO BE DISCOLORED AND FOUR CONTAINED NECROTIC SPOTS. THE NECROTIC SPOTS WERE DETERMINED TO BE RELATED TO STRESS RESULTING FROM THE CADMIUM CONTAMINATION (SLOAN, 1986).

CRAB SAMPLES TAKEN FROM DOWNRIVER LOCATIONS WERE ALSO FOUND TO BE CONTAMINATED WITH CADMIUM. THIS CONTAMINATION MAY NOT BE DIRECTLY ATTRIBUTABLE TO EAST FOUNDRY COVE CONTAMINATION, SINCE CADMIUM CONTAMINATION IS A WIDESPREAD PROBLEM IN THE HUDSON RIVER, AND A SIGNIFICANT QUANTITY OF CADMIUM WAS DISCHARGED TO THE HUDSON RIVER AT THE PIER SITE.

TOTAL CADMIUM CONCENTRATIONS IN WATER GREATER THAN 7-10 UG/L HAVE BEEN OBSERVED TO REDUCE HATCHABILITY OF EGGS, INCREASE LARVAL FISH MORTALITIES, AND DECREASE STANDING CROP SIZE (USEPA, 1979; EATON, 1974; EISLER, 1971). ZOOPLANKTON, PARTICULARLY THE SENSITIVE FORMS SUCH AS CLADOCERANS, HAVE BEEN DEMONSTRATED TO BE SIGNIFICANTLY AFFECTED BY DISSOLVED CADMIUM CONCENTRATIONS OF 0.7 TO 3.4 UG/L (ANDERSON, ET. AL. 1975). THUS, SOME OF THE OBSERVED CONCENTRATIONS OF CADMIUM DETECTED AT THE SITE MAY BE SUFFICIENT TO IMPACT SUBSTANTIALLY AQUATIC LIFE.

AS CAN BE SEEN BY THE DATA, CADMIUM CONTAMINATION IS EVIDENT IN ALL TROPHIC LEVELS AND IS BEING BIOACCUMULATED THROUGH THE FOOD CHAIN. FIGURE 21 SHOWS THAT AQUATIC ORGANISMS EXPOSED TO THE FOUNDRY COVE AREA FOR AS LITTLE AS SEVEN DAYS SUBSTANTIALLY INCREASE THEIR TISSUE LEVELS OF CADMIUM (ACRES, 1985). CONSEQUENTLY, TRANSIENT SPECIES OF FISH AND BLUE CRAB WHICH VENTURE INTO THE FOUNDRY COVE AREA FOR SHORT PERIODS OF TIME MAY EXPERIENCE SIMILAR CADMIUM CONTAMINATION. LEVINTON HAS SHOWN THAT GENETIC SELECTION IS OCCURRING AS A RESULT OF THE CADMIUM CONTAMINATION AND THAT ORGANISMS TRANSPLANTED FROM SOUTH COVE WILL NOT SURVIVE IN EAST FOUNDRY COVE (SLOAN, 1986). TO DATE, HOWEVER, THE ONLY ACUTE EFFECTS OF THE HIGH SEDIMENT CONCENTRATIONS HAVE BEEN SHOWN BY KNEIP (1980) TO BE A DECREASE IN DIVERSITY AND ABUNDANCE OF THE BENTHIC COMMUNITY WHERE SEDIMENT CONCENTRATIONS WERE GREATER THAN 10,000 MG/KG CADMIUM IN EAST FOUNDRY COVE MARSH. MUSKRATS, HOWEVER, ARE HAVING A DIFFICULT TIME SURVIVING IN EAST FOUNDRY COVE AS COMPARED TO CONSTITUTION MARSH (SLOAN, 1986).

GENERALLY, CONSTITUTION MARSH IS CONSIDERED TO BE HEALTHY BASED ON OBSERVATIONS BY MANY RESEARCHERS WHO HAVE WORKED AT THIS SITE BUT HAVE BEEN UNABLE TO FIND ANY MAJOR ECOSYSTEM-WIDE IMPACT WHICH COULD HAVE RESULTED FROM A STRESSED ENVIRONMENT. BECAUSE OF THE RARITY OF EXTENSIVE CATTAIL STANDS, CONSTITUTION MARSH MAY REPRESENT AN IMPORTANT COMPONENT OF THE LARGER HUDSON RIVER ESTUARY. THE HABITAT IT PROVIDES FOR NESTING LEAST BITTERN AND WOOD DUCK, AND MIGRATING WATERFOWL AND RAPTOR IS OF REGIONAL IMPORTANCE (ACRES, 1985 AND EBASCO RI, 1986).

THE CONTRIBUTION OF THE SITE'S WETLANDS IN THE SUPPORT OF THE HUDSON ESTUARIES FISHERY RESOURCES IS NOT KNOWN. MANY FISH SPECIES RESIDE IN OR TEMPORARILY ENTER THE WETLANDS FOR FEEDING AND/OR SPAWNING. IN ADDITION, THE CONTRIBUTION OF MARSH INVERTEBRATES TO THE HUDSON RIVER FOOD WEB HAS NOT BEEN EXTENSIVELY STUDIED. GENERALLY, ESTUARINE INVERTEBRATE ARE AN IMPORTANT LINK BETWEEN DETRITUS, ALGAE, FISH, BIRDS, REPTILES, AND MAMMALS.

NICKEL HAS BEEN FOUND TO BE LESS TOXIC THAN CADMIUM. SUSCEPTIBILITY TO NICKEL TOXICITY IN AQUATIC PLANTS IS FOR THE MOST PART, SPECIES-DEPENDENT. THE NICKEL UPTAKE RATE INCREASES WITH EXPOSURE CONCENTRATION, AND MUCH OF THE METAL IS BOUND INTERNALLY. SIGNIFICANT AQUATIC PLANT GROWTH AND PHOTOSYNTHESIS REDUCTIONS GENERALLY HAVE BEEN FOUND TO OCCUR AT WATER CONCENTRATIONS OF 0.1-0.5 MG/L (MOORE AND RAMAMOORTHY, 1984). THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER LISTS NICKEL AND ITS SOLUBLE FORMS AS ANIMAL POSITIVE CARCINOGENS (SITTIG, 1981).

COBALT CONCENTRATION OF 0.04 MG/L IN WATER HAVE BEEN FOUND TO RETARD ALGAL GROWTH (COLEMAN, ET. AL, 1971).

- HUMAN HEALTH

ALTHOUGH CADMIUM CONCENTRATIONS IN THE TYPICALLY INGESTED TISSUES OF EDIBLE SPECIES OF FISH AND CRAB DO NOT INDICATE AN IMMEDIATE PUBLIC HEALTH HAZARD, LEVELS IN LIVER AND KIDNEY TISSUES ARE SUFFICIENTLY HIGH TO WARRANT ATTENTION TO THE POTENTIAL FOR SUCH A RISK TO HUMANS.

CADMIUM HAS NO KNOWN BENEFICIAL OR ESSENTIAL ROLE IN HUMAN HEALTH. TYPICALLY, APPROXIMATELY 5-6 PERCENT OF THE CADMIUM ENTERING THE GASTROINTESTINAL TRACT IS ABSORBED. AFTER ABSORPTION, THE BLOOD TRANSPORTS CADMIUM THROUGHOUT THE BODY. THE LIVER TAKES UP THE CADMIUM WHERE IT IS INCORPORATED INTO A METAL-BINDING PROTEIN. THE PROTEIN-BOUND CADMIUM IS THEN RELEASED BACK INTO THE BLOOD AND IS DEPOSITED INTO THE KIDNEYS AND OTHER SOFT TISSUES, INCLUDING THE TESTES, LUNGS, PANCREAS, SPLEEN, AND VARIOUS ENDOCRINE ORGANS. THIS BINDING AND DEPOSITION PROCESS IS BELIEVED TO BE RESPONSIBLE FOR CADMIUM'S LONG HALF-LIFE (16-33 YEARS (WHO, 1972)) IN THE HUMAN BODY (USEPA, 1981). RENAL DYSFUNCTION IS THE MOST TYPICAL AND SEVERE EFFECT OF CHRONIC LOW-LEVEL CADMIUM EXPOSURE. CADMIUM IS ALSO A POTENTIAL CARCINOGEN (SITTIG, 1981).

BASED UPON A SURVEY OF CRAB CONSUMPTION BY THE RESIDENTS OF COLD SPRING, THE NEW YORK UNIVERSITY MEDICAL CENTER DETERMINED THAT A POTENTIALLY SERIOUS CHRONIC HEALTH HAZARD TO SOME PORTION OF THE CRAB-EATING POPULATION DOES EXIST (KNEIP ET. AL., 1979). USING EXTRAPOLATED DATA FROM JUVENILE AND ADULT CRABS, IT WAS ESTIMATED BY KNEIP THAT CRAB CONSUMPTION BY SOME COLD SPRING RESIDENTS AT THE PRESENT LEVEL COULD LEAD TO CRITICAL KIDNEY DAMAGE IN 12.5 TO 50 YEARS. THE NEW YORK STATE COMMISSIONER OF HEALTH, ON APRIL 21, 1977, ISSUED A HEALTH ADVISORY THAT CRABS FROM FOUNDRY COVE NOT BE CONSUMED. WIEDOW (1981) INDICATED A POSSIBLE WIDESPREAD PROBLEM AS CRABS TAKEN FROM OTHER AREAS OF THE HUDSON RIVER HAD ELEVATED CADMIUM LEVELS, AS WELL (5-40 UG CADMIUM PER GRAM WET WEIGHT IN THE HEPATOPANCREAS). THEREFORE, AN EXPANSION OF THE PREVIOUS WARNING WAS MADE IN THE SPRING OF 1981, ADVISING THE PUBLIC TO EAT NOT MORE THAN ONE MEAL A WEEK OF CRABS TAKEN FROM THE HUDSON RIVER.

IN TERMS OF THE DEGREE OF THE THREAT TO HUMAN HEALTH, NICKEL IS LESS TOXIC THAN CADMIUM. LOCAL EXPOSURE TO NICKEL IRRITATES THE NOSE, EYES, MOUTH, THROAT, SKIN, AND VARIOUS PARTS OF THE RESPIRATORY AND GASTROINTESTINAL SYSTEMS. ABSORPTION, HOWEVER, DOES NOT OCCUR (SITTIG, 1981).

INGESTION OR INHALATION OF HIGH CONCENTRATIONS OF COBALT GENERALLY RESULTS IN VOMITING, DIARRHEA, AND A SENSATION OF "HOTNESS" (SITTIG, 1981).

BASED UPON THE RESULTS OF A PROBABILISTIC HUMAN HEALTH IMPACT ASSESSMENT PREPARED BY EBASCO, THE FOLLOWING CONCLUSIONS WERE DRAWN:

1. COMPONENTS OF THE BIOTA OF FOUNDRY COVE ARE CONTAMINATED WITH CADMIUM TO THE EXTENT THAT LARGE INDISCRETE INDIVIDUAL CONSUMPTION OF CERTAIN SPECIES PRESENTS A HUMAN HEALTH RISK.

2. THE AREA OF GREATEST HUMAN HEALTH CONCERN IS EAST FOUNDRY COVE MARSH WHERE SIGNIFICANT LEVELS OF CADMIUM CONTAMINATION HAVE BEEN FOUND IN THE SEDIMENTS. CONSTITUTION MARSH CONTAMINATION PRESENTS A MINOR HEALTH IMPACT.

3. CONSUMPTION OF AQUATIC BIOTA WAS IDENTIFIED AS THE MOST PROBABLE MEANS OF HUMAN EXPOSURE TO SITE CONTAMINANTS. CONCENTRATIONS OF CADMIUM LESS THAN 900 MG/KG IN EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH SEDIMENTS WILL POSE NO HUMAN HEALTH-RELATED THREATS THROUGH THE CONSUMPTION OF AQUATIC BIOTA.

4. DIRECT CONTACT AND INGESTION OF SUSPENDED CONTAMINATED SEDIMENT DURING RECREATIONAL USES OF THIS AREA, SUCH AS SWIMMING, BOATING, AND NATURE OBSERVATION, ARE PATHWAYS OF LITTLE IMPORTANCE.

TO ALLEVIATE THE ENVIRONMENTAL AND POTENTIAL HUMAN HEALTH EFFECTS STEMMING FROM THE EXCESSIVE LEVELS OF HEAVY METALS CONTAMINATION FOUND IN THE EAST FOUNDRY COVE MARSH SEDIMENTS, AND TO PREVENT FURTHER MIGRATION OF THESE HIGHLY CONTAMINATED SEDIMENTS TO FOUNDRY COVE, THE HUDSON RIVER, AND CONSTITUTION MARSH, REMEDIAL ACTION IS CALLED FOR.

#ENF
ENFORCEMENT:

ON SEPTEMBER 22, 1970, A COMPLAINT WAS FILED (70 CIV. 4110) IN THE U.S. DISTRICT COURT, SOUTHERN DISTRICT OF NEW YORK, BY THE UNITED STATES AGAINST MARATHON BATTERY COMPANY FOR VIOLATION OF SECTIONS 407, 413, AND 441 OF TITLE 33 OF THE UNITED STATES CODE ("REFUSE ACT"). THE COMPLAINT SOUGHT PRELIMINARY AND PERMANENT INJUNCTIVE RELIEF, ENJOINING AND RESTRAINING THE "DISCHARGE OR DEPOSIT OF ANY ALKALI, OR ANY SALT OF NICKEL, CADMIUM OR COBALT... DIRECTLY OR INDIRECTLY INTO FOUNDRY COVE OR THE HUDSON RIVER..." AND ORDERING MARATHON BATTERY COMPANY TO REMOVE PROMPTLY THE "DEPOSITED SALTS, AND ANY OTHER REFUSE OR DEBRIS DEPOSITED IN FOUNDRY COVE.". THE COMPLAINT WAS AMENDED IN THE COURSE OF THE FOLLOWING YEAR, AND DEFENDANTS FILED THEIR ANSWERS. SONOTONE CORPORATION, GOULD, INCORPORATED, CLEVITE CORPORATION, THE STATE OF NEW YORK, AND OLD FOUNDRY REALTY CORPORATION HAD BEEN JOINED AS DEFENDANTS. SUBSEQUENTLY, THE SUIT WAS SETTLED OUT OF COURT.

A FINAL JUDGMENT, ENTERED ON JUNE 8, 1972, REQUIRED THE REMOVAL OF CONTAMINATED SEDIMENTS TO A CONCENTRATION OF 900 MILLIGRAMS PER KILOGRAM (MG/KG) FROM THE OUTFALL AREA ADJACENT TO THE DISCHARGE PIPE, THE CHANNEL LEADING TO THE MAIN BODY OF FOUNDRY COVE, AND A PORTION OF THE COVE. MARATHON BATTERY COMPANY, SONOTONE CORPORATION, CLEVITE CORPORATION, AND GOULD, INCORPORATED PARTICIPATED IN THE LIMITED CLEANUP OF FOUNDRY COVE.

IN RESPONSE TO A REPORT FILED WITH THE COURT ON BEHALF OF THE DEFENDANTS, THE UNITED STATES FILED A SATISFACTION OF JUDGMENT, STATING THAT "THE DEFENDANTS...ARE DEEMED TO HAVE COMPLIED WITH THE TERMS OF THE FINAL JUDGMENT, AS AMENDED, WITH RESPECT TO THE REMOVAL OF THE DEPOSITS OF CADMIUM FROM FOUNDRY COVE AND ARE RELIEVED FROM ANY FURTHER OBLIGATION WITH RESPECT THERETO." (REI, 1983).

THE ARMY WAS NOT NAMED A CO-DEFENDANT IN THE U.S. ATTORNEY'S ORIGINAL SUIT. MARATHON BATTERY COMPANY, SONOTONE CORPORATION, CLEVITE CORPORATION, AND GOULD, INCORPORATED ALLEGED THAT THE ARMY HAD PARTICIPATED IN DAMAGING FOUNDRY COVE BY ENGINEERING AND APPROVING THE PLANT DESIGN AND BY CONSTRUCTING THE PLANT.

THEREFORE, THEY CLAIMED THE ARMY SHOULD BE LIABLE FOR DAMAGES. THE ARMY WAS NOT REQUIRED TO JOIN IN THE SUIT, AND, SINCE THE CASE WAS SETTLED OUT OF COURT, THE JUDGE NEVER RULED ON THE QUESTION OF ARMY RESPONSIBILITY (PUTNAM, HAYES, & BARTLETT, 1983).

EPA INTENDS TO PROCEED UNDER CERCLA AGAINST THE POTENTIALLY RESPONSIBLE PARTIES (PRPS). CONSEQUENTLY NOTICE LETTERS WERE SENT TO U.S. ARMY, MARATHON BATTERY COMPANY, GOULD, INCORPORATED, SONOTONE INTERNATIONAL, AND IMPERIAL CLEVITE, AS WELL AS TO MERCHANDISE DYNAMICS, INCORPORATED, THE CURRENT PROPERTY OWNER.

MARATHON BATTERY COMPANY, GOULD, INCORPORATED AND THE COE HAVE COOPERATED IN SUPPLYING INFORMATION AND MEETING WITH THE AGENCY. MARATHON BATTERY COMPANY HAS PROVIDED ESTIMATES OF METALLIC CONTAMINANT DISCHARGES INTO FOUNDRY COVE WHICH OCCURRED DURING EACH YEAR OF OPERATION THROUGHOUT THE LIFE OF THE PLANT. MARATHON BATTERY COMPANY AND GOULD, INCORPORATED HAVE COMMENTED ON THE RI AND FS DOCUMENTS. FROM AN ARCHIVAL SEARCH, THE COE HAS PREPARED A SUMMARY OF THE HISTORY OF THE SITE AND THE ASSOCIATED THREAT.

IT IS EPA'S INTENTION TO NEGOTIATE WITH THE PRPS FOR THE IMPLEMENTATION OF THE REMEDY. IF THESE NEGOTIATIONS ARE FRUITLESS, EPA WILL PURSUE ALL ITS LEGAL OPTIONS UNDER CERCLA.

#AE
ALTERNATIVES EVALUATION:

THE PRIMARY OBJECTIVE OF THE FEASIBILITY STUDY WAS TO EVALUATE REMEDIAL ALTERNATIVES USING A COST-EFFECTIVE APPROACH CONSISTENT WITH THE GOALS AND OBJECTIVES OF CERCLA. ACCORDING TO 40 CFR 300.68(I), THE APPROPRIATE EXTENT OF A REMEDY WILL BE BASED UPON THE SELECTION OF A COST-EFFECTIVE REMEDIAL ALTERNATIVE WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGE TO AND PROVIDES ADEQUATE PROTECTION OF THE PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT. THE NCP OUTLINES PROCEDURES AND CRITERIA TO BE USED IN SELECTING THE MOST COST-EFFECTIVE ALTERNATIVE.

THE FIRST STEP IS TO EVALUATE PUBLIC HEALTH AND ENVIRONMENTAL EFFECTS AND WELFARE CONCERNS ASSOCIATED WITH THE PROBLEM. CRITERIA TO BE CONSIDERED ARE OUTLINED IN SECTION 300.68(E) OF THE NCP AND INCLUDE SUCH FACTORS

AS ACTUAL OR POTENTIAL DIRECT CONTACT WITH HAZARDOUS MATERIAL, DEGREE OF CONTAMINATION OF DRINKING WATER, AND EXTENT OF ISOLATION AND/OR MIGRATION OF THE CONTAMINANT.

THE NEXT STEP IS TO DEVELOP A LIMITED LIST OF POSSIBLE REMEDIAL ALTERNATIVES WHICH COULD BE IMPLEMENTED. THE NO-ACTION ALTERNATIVE MAY BE INCLUDED ON THE LIST.

THE THIRD STEP IN THE PROCESS IS TO PROVIDE AN INITIAL SCREENING OF THE REMAINING ALTERNATIVES. THE COSTS, RELATIVE EFFECTIVENESS IN MINIMIZING THREATS, AND ENGINEERING FEASIBILITY ARE REVIEWED HERE. THE NO-ACTION ALTERNATIVE MAY BE INCLUDED FOR FURTHER EVALUATION WHEN RESPONSE ACTIONS MAY CAUSE GREATER ENVIRONMENTAL OR HEALTH DAMAGE THAN NO-ACTION RESPONSES. A NO-ACTION ALTERNATIVE MAY ALSO BE INCLUDED IF IT IS APPROPRIATE RELATIVE TO THE EXTENT OF THE EXISTING THREAT OR IF RESPONSE ACTIONS PROVIDE NO GREATER PROTECTION. FROM THE EVALUATION OF EXISTING DATA AND INFORMATION ON THE NATURE AND EXTENT OF THE CONTAMINATION ASSOCIATED WITH THE EAST FOUNDRY COVE MARSH/CONSTITUTION MARSH PORTION OF MARATHON BATTERY COMPANY SITE, THE FOLLOWING REMEDIAL OBJECTIVES WERE ESTABLISHED:

- PREVENTION OF ALL BIOTA FROM CONTACTING EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH CONTAMINATED SEDIMENTS THAT WOULD THREATEN THEM;

- PREVENTION OF RESUSPENSION AND REDISTRIBUTION OF THE CONTAMINATED SEDIMENTS THAT WOULD THREATEN THE AREA FLORA AND FAUNA; AND

- MINIMIZATION OF THE DISTURBANCE TO CONSTITUTION MARSH, SINCE THIS WETLAND IS A DELICATE ECOLOGICAL HABITAT.

IN THE ABSENCE OF STANDARDS OR CRITERIA FOR CONTAMINANT LEVELS OF CADMIUM, NICKEL, AND COBALT IN SEDIMENTS, TO EVALUATE REMEDIAL ALTERNATIVES FOR EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH, IT WAS NECESSARY TO ESTABLISH AN ACCEPTABLE CADMIUM CONTAMINANT LEVEL FOR THE SITE.

BASED UPON EBASCO'S PROBABILISTIC HUMAN HEALTH IMPACT ASSESSMENT, 900 MG/KG WAS FOUND TO BE AN ACCEPTABLE CADMIUM CONCENTRATION LEVEL TO PROTECT PUBLIC HEALTH. INFORMATION OF A SIMILAR NATURE PERTAINING TO THE PROTECTION OF THE ENVIRONMENT, HOWEVER, WAS NOT AVAILABLE, ALTHOUGH SEDIMENT CONCENTRATIONS RANGING FROM 10 MG/KG (BACKGROUND) TO 900 MG/KG CADMIUM HAVE BEEN SUGGESTED FOR REMEDIATION ACTION LEVELS FOR THE SITE.

MCNAUGHTON (1974) OBSERVED REDUCED GROWTH OF BROAD-LEAF CATTAILS GROWN IN SOILS WITH 73 MG/KG CADMIUM RELATIVE TO PLANTS GROWN ON SOILS WITH APPROXIMATELY 2 MG/KG CADMIUM.

RESEARCH PERFORMED FOR EPA (JRB, 1984) ESTABLISHED SEDIMENT CRITERIA FOR CADMIUM BASED UPON LIMITING CONCENTRATIONS IN WATER TO LEVELS BELOW EPA AMBIENT WATER QUALITY CRITERIA. ALTHOUGH THIS TECHNIQUE HAS NOT BEEN THOROUGHLY TESTED AT THIS TIME, PRELIMINARY RESULTS HAVE SHOWN THAT SEDIMENT CADMIUM TOXICITY DECREASES WITH INCREASING ORGANIC CONTENT: FOR A TOTAL ORGANIC CARBON (TOC) CONCENTRATION OF 5%, THE CHRONIC SEDIMENT CADMIUM CRITERION WAS FOUND TO BE 38.5 MG/KG, AND AT A TOC OF 10%, THE CHRONIC LEVEL WAS FOUND TO BE 77 MG/KG. EBASCO'S FIELD RESULTS SHOWING AN AVERAGE TOC VALUE OF 7% FOR THIS AREA (SEE TABLE 7) WOULD IMPLY THAT A CADMIUM CONCENTRATION SOMEWHERE IN THE RANGE OF 60 MG/KG WOULD BE REQUIRED TO PREVENT CHRONIC EXPOSURE. THE PROPORTION OF CADMIUM FOUND IN THE SEDIMENT TO THAT IN AQUEOUS SOLUTION IN THE MARSH, HOWEVER, WILL DEPEND NOT ONLY ON TOC, BUT ON OTHER SITE-SPECIFIC FACTORS INCLUDING WATER CHEMISTRY, PH, OXIDATION/REDUCTION POTENTIAL, AND TEMPERATURE. THEREFORE, THE MODEL FOR PARTITIONING BASED ON SIMPLIFYING ASSUMPTIONS WILL ONLY APPROXIMATE SITE-SPECIFIC CADMIUM CRITERION (ERT, 1986).

BASED UPON AN ANALYSIS OF AVAILABLE INFORMATION AND THE ABOVE-REFERENCED RESEARCH, AS WELL AS DISCUSSIONS WITH STATE AND FEDERAL FISH AND WILDLIFE EXPERTS, A SITE-SPECIFIC SEDIMENT CADMIUM REMEDIATION LEVEL OF 100 MG/KG WAS ESTABLISHED.

BASED UPON THE ANALYSES DESCRIBED ABOVE, REMEDIATION TO BACKGROUND WOULD BE UNNECESSARILY OVERPROTECTIVE. REMEDIATION TO 900 MG/KG, ON THE OTHER HAND, WOULD NOT BE ADEQUATE TO PROTECT AGAINST THE THREAT TO THE ENVIRONMENT POSED BY THE SITE. (IT SHOULD BE NOTED THAT THE PREVIOUS DREDGING OPERATION TO 900 MG/KG WAS UNSUCCESSFUL.).

NO ACTION LEVEL WAS ESTABLISHED FOR NICKEL AND COBALT SINCE IT WAS ASSUMED THAT ANY REMEDIAL ACTION UNDERTAKEN WOULD MITIGATE COBALT AND NICKEL CONTAMINANT LEVELS, AS WELL.

WITH THE STATED OBJECTIVES AND RESPONSE CRITERIA IN MIND, AN EXTENSIVE LIST OF FEASIBLE REMEDIAL TECHNOLOGIES WAS DEVELOPED. (SEE TABLE 11.). DUE TO THE COMPLEX ENVIRONMENTAL, TECHNICAL, REGULATORY AND HEALTH ISSUES ASSOCIATED WITH THIS SITE, THE NUMBER OF TECHNOLOGIES AND POSSIBLE COMBINATIONS WAS CONSIDERABLE, NECESSITATING A PHASED EVALUATION PROCESS.

IN ORDER TO EVALUATE THE APPLICABILITY AND SUITABILITY OF POTENTIAL REMEDIAL TREATMENT TECHNOLOGIES, BENCH SCALE FEASIBILITY TESTS WERE PERFORMED. THESE TESTS GENERATED EMPIRICAL DATA ON THE PERFORMANCE OF VARIOUS TECHNOLOGIES FOR TRANSPORT OR TREATMENT. THE RESULTS FROM THESE BENCH-SCALE TESTS SHOWED THAT: (1) MOST OF THE CONTAMINANT METALS FOUND IN THE DREDGING WATER ARE BOUND TO THE RESUSPENDED SOLIDS AND ONLY TRACE CONCENTRATIONS OF THE METALS WILL LEACH OUT IN THE DISSOLVED PHASE; (2) DREDGING WATER WILL REQUIRE TREATMENT TO MEET NYSDEC SUSPENDED SOLIDS AND TOTAL METAL STANDARDS; (3) ACID LEACHING OF THE SEDIMENTS TO REMOVE SIGNIFICANT QUANTITIES OF THE CONTAMINANT METALS IS NOT AN EFFECTIVE REMEDIAL TECHNOLOGY; (4) HYDRAULICALLY DREDGED SEDIMENT CAN BE SUFFICIENTLY THICKENED BY SETTLING, AND CAN BE EFFICIENTLY DEWATERED BY FILTRATION WITHOUT ADDING CONDITIONING AGENTS; AND (5) THE CONTAMINANT METALS CAN BE CHEMICALLY FIXATED IN THE SEDIMENTS AND THE FIXATED SEDIMENTS WILL PASS THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) EP TOXICITY TEST TO BE CLASSIFIED AS NON-HAZARDOUS.

A FEASIBILITY SCREENING ELIMINATED THOSE REMEDIAL TECHNOLOGIES THAT WERE NOT TECHNICALLY APPLICABLE OR EFFECTIVE BECAUSE OF SITE CONDITIONS. TABLE 12 SUMMARIZES THE RESULTS OF THE FEASIBILITY SCREENING OF TECHNOLOGIES.

THE REMEDIAL TECHNOLOGIES SURVIVING THE FEASIBILITY SCREENING WERE COMBINED INTO FIVE REMEDIAL ALTERNATIVES:

I. NO ACTION
II. HYDRAULIC DREDGING/THICKENING/FIXATION/OFF-SITE DISPOSAL
III. HYDRAULIC DREDGING/THICKENING/FIXATION/ON-SITE DISPOSAL
IV. HYDRAULIC DREDGING/THICKENING/DEWATERING/OFF-SITE DISPOSAL
V. CONTAINMENT.

CONSIDERING THE DIFFERENT DEGREES OF CONTAMINATION LEADING TO VARYING DEGREES OF PUBLIC HEALTH AND ENVIRONMENTAL RISK, AND CONSIDERING THE DIFFERING PHYSICAL CONDITIONS BETWEEN EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH, THE ALTERNATIVES WERE SCREENED IN TERMS OF THE TWO SUB-SITES: EAST FOUNDRY COVE MARSH (ECM), AND CONSTITUTION MARSH (CM). THE PURPOSES OF THIS SUBDIVISION WERE TO ALLOW CONSIDERATION OF DIFFERENT REMEDIAL TECHNOLOGIES/ALTERNATIVES FOR BOTH AREAS AND TO PROVIDE THE FLEXIBILITY IN DECISION-MAKING TO SELECT THE MOST COST-EFFECTIVE REMEDIAL ALTERNATIVE FOR BOTH AREAS.

BASED ON THESE CONSIDERATIONS, THE POTENTIAL REMEDIAL ALTERNATIVES IDENTIFIED FOR THE TWO SUB-SITES ARE AS FOLLOWS:

EAST FOUNDRY COVE MARSH (ECM)

- ALTERNATIVE ECM-1: NO ACTION

- ALTERNATIVE ECM-2: HYDRAULIC DREDGING/THICKENING/ FIXATION/OFF-SITE DISPOSAL

- ALTERNATIVE ECM-3: HYDRAULIC DREDGING/THICKENING/ FIXATION/ON-SITE DISPOSAL

- ALTERNATIVE ECM-4: HYDRAULIC DREDGING/THICKENING/ DEWATERING/OFF-SITE DISPOSAL

- ALTERNATIVE ECM-5: CONTAINMENT

CONSTITUTION MARSH (CM)

- ALTERNATIVE CM-1: NO ACTION

- ALTERNATIVE CM-2: HYDRAULIC DREDGING/THICKENING/ FIXATION/OFF-SITE DISPOSAL

- ALTERNATIVE CM-3: HYDRAULIC DREDGING/THICKENING/ DEWATERING/OFF-SITE DISPOSAL

- ALTERNATIVE CM-4: HYDRAULIC DREDGING/THICKENING/ FIXATION/ON-SITE DISPOSAL

- ALTERNATIVE CM-5: CONTAINMENT.

THESE ALTERNATIVES WERE SUBJECTED TO A SECONDARY SCREENING WITH THE OBJECTIVE OF IDENTIFYING THOSE ALTERNATIVES WITH SUFFICIENT MERIT TO UNDERGO DETAILED EVALUATION. THE EMPHASIS IN THE SECONDARY SCREENING WAS ON THE TECHNICAL FEASIBILITY, ENVIRONMENTAL EFFECTS, AND ORDER-OF-MAGNITUDE COSTS.

BASED UPON THE SECONDARY SCREENING OF THESE REMEDIAL ALTERNATIVES, CONSTITUTION MARSH ALTERNATIVE CM-4, HYDRAULIC DREDGING THICKENING/FIXATION/ON-SITE DISPOSAL, AND ALTERNATIVE CM-5, CONTAINMENT, WERE DELETED FROM FURTHER CONSIDERATION. ALTERNATIVE CM-4 WOULD REQUIRE THE DREDGING OF A SIGNIFICANT VOLUME OF SEDIMENTS. THIS ALTERNATIVE WAS DELETED FROM FURTHER CONSIDERATION BECAUSE, DUE TO LIMITED LAND AVAILABILITY, A 7 HA ON-SITE DISPOSAL SITE IS NOT FEASIBLE. BECAUSE OF THE SIGNIFICANT ENVIRONMENTAL IMPACTS ASSOCIATED WITH CAPPING A 40 HA WETLAND, ALTERNATIVE CM-5 WAS DELETED FROM FURTHER CONSIDERATION.

THE REMAINING ALTERNATIVES WERE THEN EVALUATED IN TERMS OF TECHNICAL FEASIBILITY, ENVIRONMENTAL CONSIDERATIONS, INSTITUTIONAL CONSIDERATIONS, PUBLIC HEALTH CONSIDERATIONS, AND COST.

THE NCP REQUIRES THAT AT LEAST ONE REMEDIAL ALTERNATIVE SHOULD BE CONSIDERED FOR EACH OF THE FIVE CATEGORIES LISTED BELOW:

1) A NO-ACTION ALTERNATIVE.

2) ALTERNATIVES WHICH ATTAIN APPLICABLE OR RELEVANT AND APPROPRIATE (ARAR) FEDERAL PUBLIC HEALTH OR ENVIRONMENTAL STANDARDS.

3) ALTERNATIVES WHICH EXCEED ARAR FEDERAL PUBLIC HEALTH OR ENVIRONMENTAL STANDARDS.

4) ALTERNATIVES FOR TREATMENT OR DISPOSAL AT AN APPROVED OFF-SITE FACILITY.

5) ALTERNATIVES WHICH DO NOT ATTAIN APPLICABLE OR RELEVANT FEDERAL PUBLIC HEALTH OR ENVIRONMENTAL STANDARDS, BUT WILL REDUCE THE LIKELIHOOD OF PRESENT OR FUTURE THREAT FROM HAZARDOUS SUBSTANCES.

TABLE 13 SUMMARIZES THE STATUS OF EACH OF THE ALTERNATIVES CONSIDERED WITH REGARD TO THESE FIVE CATEGORIES.

ACCORDING TO THE NCP, A TOTAL COST ESTIMATE MUST ALSO BE CONSIDERED FOR REMEDIAL ACTIONS AND MUST INCLUDE BOTH CONSTRUCTION AND ANNUAL OPERATION AND MAINTENANCE COSTS. THESE COSTS ARE ESTIMATED FOR THE ALTERNATIVES UNDER CONSIDERATION. A PRESENT WORTH VALUE ANALYSIS WAS USED TO CONVERT THE ANNUAL OPERATION AND MAINTENANCE COSTS TO AN EQUIVALENT SINGLE VALUE. THESE COSTS WERE CONSIDERED OVER A THIRTY YEAR PERIOD AT A TEN PERCENT DISCOUNT RATE.

I. NO ACTION:

ALTERNATIVE ECM-1

THE NO-ACTION ALTERNATIVE FOR EAST FOUNDRY COVE MARSH WOULD INVOLVE RESTRICTING ACCESS TO THE SITE AND

MINIMIZATION OF RESUSPENSION OF THE SEDIMENTS AS MUCH AS POSSIBLE. THIS ALTERNATIVE WOULD INCLUDE A 2.5 M HIGH, 490 M LONG SECURITY FENCE THAT WOULD BE INSTALLED ON THE NORTH EDGE OF THE MARSH TO RESTRICT PUBLIC ACCESS. A 600 M LONG PERMANENT SILT CURTAIN WOULD BE CONSTRUCTED ALONG THE SOUTH EDGE OF THE MARSH TO RESTRICT SEDIMENT MIGRATION INTO EAST FOUNDRY COVE.

THE KEMBLE AVENUE STORM SEWER AND THE NYSDOT STORM SEWER WOULD BE DIVERTED BY CONSTRUCTING TWO DIVERSION DITCHES ALONG THE NORTH EDGE OF EAST FOUNDRY COVE MARSH. THESE DIVERSION DITCHES WOULD DISCHARGE INTO EAST FOUNDRY COVE AND FOUNDRY BROOK, RESPECTIVELY. SUCH DIVERSION WOULD MINIMIZE INFLOW TO EAST FOUNDRY COVE MARSH AND WOULD, THEREFORE, MINIMIZE RESUSPENSION OF THE HIGHLY CONTAMINATED SEDIMENTS.

LONG-TERM MONITORING OF THE SITE WOULD BE PERFORMED IN ORDER TO EVALUATE THE PERFORMANCE OF THE NO-ACTION ALTERNATIVE. MONITORING WOULD CONSIST OF ANNUAL INSPECTION OF THE DIVERSION DITCHES, AS WELL AS SAMPLING AND TESTING OF EAST FOUNDRY COVE MARSH SEDIMENTS AND WATER EVERY THREE MONTHS DURING THE FIRST YEAR AND EVERY SIX MONTHS THEREAFTER FOR THIRTY YEARS IN ORDER TO DETECT SEDIMENT MIGRATION FROM THE MARSH.

ALTERNATIVE CM-1

THE NO-ACTION ALTERNATIVE FOR CONSTITUTION MARSH WOULD ADDRESS RESTRICTION OF PUBLIC ACCESS AND LONG-TERM MONITORING. DUE TO THE RELATIVELY LOW CONCENTRATIONS OF CONTAMINANTS AND EXISTING DIFFICULT ACCESS, ERECTION OF A SECURITY FENCE IS CONSIDERED UNNECESSARY. ONLY WARNING SIGNS WOULD BE PLACED AT PROMINENT LOCATIONS. LONG-TERM MONITORING OF THE SITE FOR THIRTY YEARS WOULD CONSIST OF SAMPLING AND TESTING OF SEDIMENTS AND WATER IN ORDER TO MONITOR CONTAMINATED SEDIMENT MIGRATION. PARTICULAR EMPHASIS WILL BE PLACED ON MONITORING THE KNOWN CADMIUM HOT SPOTS TO DETERMINE, IF IN FACT, NATURAL SEDIMENTATION AND TIDAL FLUSHING WILL REDUCE THE CADMIUM AVAILABILITY. THE SAMPLING AND TESTING WOULD BE DONE ONCE EVERY THREE MONTHS IN THE FIRST YEAR AND EVERY SIX MONTHS THEREAFTER. IN ADDITION, BIOASSAY/BIOACCUMULATION STUDIES WOULD BE PERFORMED PERIODICALLY DURING THE THIRTY YEAR MONITORING PERIOD.

DISCUSSION

WITH RESPECT TO THE NO-ACTION ALTERNATIVE, THE RESULTS OF THE FIELD INVESTIGATION AND THE FEASIBILITY STUDY INDICATE THAT THERE ARE SIGNIFICANTLY HIGH LEVELS OF HEAVY METALS CONTAMINATION IN THE SEDIMENTS OF EAST FOUNDRY COVE MARSH. THESE SEDIMENTS ARE THE SOURCE FOR ELEVATED CADMIUM, NICKEL, AND COBALT LEVELS FOUND IN EAST FOUNDRY COVE, WEST FOUNDRY COVE, PORTIONS OF THE HUDSON RIVER, AND CONSTITUTION MARSH BIOTA. THE SEDIMENT DATA SPECIFICALLY INDICATE:

- THE EXISTING CONCENTRATIONS OF CADMIUM, NICKEL AND COBALT MEASURED IN THE SEDIMENTS OF EAST FOUNDRY COVE MARSH SHOW GROSS CONTAMINATION.

- ALTHOUGH A NOTABLE DECREASE IN CONTAMINATION (FOUR ORDERS OF MAGNITUDE) IS OBSERVED WITH INCREASING DISTANCE FROM THE EAST FOUNDRY COVE MARSH OUTFALL, MOST OF THE PERIPHERAL AREAS DISPLAY ELEVATED SURFICIAL CONTAMINATION RELATIVE TO THE CONTROL SITE.

- THE TRANSPORT OF CONTAMINATED SEDIMENTS AWAY FROM THE OUTFALL AREA FOLLOWS PATTERNS THAT ARE DICTATED BY TIDAL AND RIVER FLOW HYDRODYNAMICS. ALTHOUGH NOT QUANTIFIED, IT IS SPECULATED THAT STORM EVENTS MAY SIGNIFICANTLY INFLUENCE DISPERSION OF THESE SEDIMENTS, ESPECIALLY IN EAST FOUNDRY COVE.

- DEPOSITION OF CONTAMINATED SEDIMENT IS A FUNCTION OF TIDAL HYDRODYNAMICS (ESPECIALLY SITE-SPECIFIC VELOCITIES), AQUATIC MACROPHYTE DENSITIES, AND RIVER CURRENTS AND CONDITIONS (ACRES, 1985).

KEY ENVIRONMENTAL AND PUBLIC HEALTH CONCERNS INCLUDE:

- CADMIUM CONTAMINATION IN THE BIOTA IS PRESENT IN ALL TROPHIC LEVELS, WITH THE BENTHIC COMMUNITY CONTAINING THE HIGHEST CONCENTRATIONS.

- CONSTITUTION MARSH, AN AUDUBON SOCIETY-OPERATED SANCTUARY IS CONTAMINATED WITH CADMIUM.

- FISH-EATING BIRDS, WATERFOWL, AND OTHER TERRESTRIAL ANIMALS THAT FEED IN THE SITE VICINITY MAY BE ADVERSELY AFFECTED DUE TO BIOACCUMULATION OF CADMIUM IN TARGET ORGANS. LITTLE IS KNOW ABOUT THE ABILITY OF ANIMALS TO RESIST EFFECTS CAUSED BY CADMIUM UPTAKE. BEHAVIORAL AND REPRODUCTIVE DISFUNCTION ARE KNOWN TO OCCUR BUT ARE NOT WELL DOCUMENTED.

- THE CONSUMPTION OF BIOTA FROM FISHING, HUNTING, AND CRABBING ACTIVITIES WITHIN FOUNDRY COVE AND CONSTITUTION MARSH EXPOSES HUMANS TO CADMIUM CONTAMINATED FOODS. IN ADDITION, FISH SPECIES MIGRATE THROUGH THE FOUNDRY COVE ON THE WAY UP THE HUDSON RIVER TO SPAWN (ACRES, 1985).

THE NO-ACTION ALTERNATIVES FOCUS ON LIMITED ADDITIONAL ACTION TO DECREASE THE RISKS ASSOCIATED WITH THE CONTAMINATED AREAS. THESE LIMITED ACTIVITIES WOULD FALL INTO THREE MAIN CATEGORIES: INCREASE PUBLIC AWARENESS; RESTRICT ACCESS; AND MONITOR CONDITIONS OVER TIME.

INCREASING PUBLIC AWARENESS WOULD BE ACCOMPLISHED BY HOLDING PUBLIC MEETINGS AND USING THE MEDIA TO MAKE PEOPLE AWARE OF THE PROBLEM AND TO INFORM PEOPLE OF THE RISKS ASSOCIATED WITH THE HEAVY METAL CONTAMINATION.

ACCESS TO CONTAMINATED AREAS WOULD BE RESTRICTED TO LIMIT THE DIRECT CONTACT OF PEOPLE WITH THE CONTAMINATION. THESE RESTRICTIONS WOULD TAKE THE FORM OF FENCING AND PUTTING ADDITIONAL LIMITS ON FISHING AND WATER SPORTS.

MONITORING OVER TIME WOULD IDENTIFY ANY CHANGES THAT OCCUR DUE TO MOVEMENT OR MIGRATION OF CONTAMINANTS RESULTING FROM NATURAL PROCESSES SUCH AS SOLUBILIZATION AND EROSION.

THE NO-ACTION ALTERNATIVE CALLS FOR NO REMEDIAL ACTION TO ADDRESS THE CONTAMINATED SEDIMENT OF EAST FOUNDRY COVE MARSH. AS A RESULT, CADMIUM, NICKEL, AND COBALT CONCENTRATIONS WOULD REMAIN IN THE EAST FOUNDRY COVE MARSH SEDIMENTS IN CONCENTRATIONS AS HIGH AS 171,000, 156,000 AND 6,700 MG/KG, RESPECTIVELY, IN THE OUTFALL AREA.

IN CONSTITUTION MARSH, THE NO-ACTION ALTERNATIVE WOULD LEAVE EXISTING CONTAMINANT LEVELS UNALTERED. TWO DISCRETE LOCATIONS OF ELEVATED CONCENTRATIONS OF CADMIUM IN SEDIMENTS RANGING FROM APPROXIMATELY 500 MG/KG TO APPROXIMATELY 1,000 MG/KG, OCCUR IN THE NORTHERN PART OF CONSTITUTION MARSH. THE NORTHERN 40 HA OF THE MARSH CONTAIN CADMIUM CONCENTRATIONS GREATER THAN 100 MG/KG. CADMIUM IS KNOWN TO ACCUMULATE IN SOME PLANT AND ANIMAL SPECIES, AND HAS ACHIEVED ELEVATED CONCENTRATIONS IN MARSH WETLAND BIOTA. THESE ELEVATED CONCENTRATIONS MAY BE SUFFICIENT TO CAUSE TOXIC EFFECTS, BUT AVAILABLE INFORMATION IS INCONCLUSIVE. THE MARSH APPEARS PRODUCTIVE AND SHOWS NO OBVIOUS SYMPTOMS OF STRESS.

UNDER THE NO-ACTION ALTERNATIVE, IT IS EXPECTED THAT SPECIES WITHIN EAST FOUNDRY COVE MARSH WILL CONTINUE TO BIOACCUMULATE CADMIUM, COMMUNITY DIVERSITY WILL REMAIN LOW FOR BENTHIC ORGANISMS, CADMIUM LEVELS IN ORGANISMS WILL CONTINUE TO BE ELEVATED, POTENTIALLY INCREASING, AND CONTAMINATED AREAS COULD REDISTRIBUTE AND EXTEND TO A GREATER AND LARGER AREA. AQUATIC VEGETATION IN THE SHALLOW AREAS OF FOUNDRY COVE, HOWEVER, TENDS TO ACT AS A DEPOSITORY FOR CONTAMINANTS FROM EAST FOUNDRY COVE MARSH.

THE MAJOR ROUTE OF EXPOSURE FOR HUMANS IS THROUGH THE INGESTION OF CONTAMINATED FISH AND SHELLFISH. UNDER THE NO-ACTION ALTERNATIVE, LONG-TERM HEALTH RISKS WOULD REMAIN SINCE THE CRITICAL EXPOSURE PATHWAY OF INGESTION OF CONTAMINATED FISH AND SHELLFISH WOULD NOT BE ELIMINATED OR CONTROLLED. FROM A PUBLIC HEALTH STANDPOINT, EXPOSURE TO CADMIUM IS OF SPECIAL CONCERN BECAUSE:

- THE 16-33 YEAR HALF-LIFE IN THE HUMAN BODY (WHO, 1972);
- CADMIUM IS STORED IN THE SOFT TISSUES, MAINLY THE KIDNEY;
- CADMIUM'S RESULTING ADVERSE HEALTH EFFECTS APPEAR TO BE IRREVERSIBLE (USEPA, 1981); AND
- EPA LISTS CADMIUM AS A POTENTIAL CARCINOGEN (SITTIG, 1981).

FOUNDRY COVE IS UTILIZED BY THE PEOPLE OF COLD SPRING FOR FISHING AND CRABBING. THE NYSDOH HAS ISSUED A CADMIUM-RELATED HEALTH ADVISORY CONCERNING THE CONSUMPTION OF CRABS FROM THE HUDSON RIVER. NYSDEC RECOMMENDS THAT NO ONE SHOULD EAT MORE THAN ONE MEAL OF CRABS FROM THE HUDSON RIVER PER WEEK, THAT THE CRAB'S LIVER SHOULD NOT BE EATEN AT ALL, AND THAT WOMEN OF CHILD-BEARING AGE AND CHILDREN UNDER FIFTEEN SHOULD NEVER EAT

ANY HUDSON RIVER CRABS.

OTHER POSSIBLE SOCIO-ECONOMIC IMPACTS WHICH MAY RESULT FROM THE NO-ACTION ALTERNATIVE INCLUDE DEPRESSED PROPERTY VALUES IN THE VICINITY OF THE COVE AND REDUCED OR NO INTEREST IN DEVELOPMENT OF AREAS AROUND OR OVERLOOKING THE COVE.

ACCORDING TO EBASCO'S PUBLIC HEALTH ASSESSMENT, IT HAS BEEN CONCLUDED THAT LESS THAN 900 MG/KG CADMIUM IN FOUNDRY COVE AND CONSTITUTION MARSH SEDIMENTS POSES NO HEALTH-RELATED CONCERNS. ACCORDINGLY, BECAUSE OF THE DEGREE OF CONTAMINATION FOUND IN CONSTITUTION MARSH, THERE IS ONLY A MINIMAL HEALTH CONCERN BECAUSE THE LOWER CONCENTRATIONS OF SEDIMENT CONTAMINANTS HAVE VERY SMALL PROBABILITIES OF EXCEEDING ACCEPTABLE HUMAN INTAKE THROUGH THE RELEVANT EXPOSURE PATHWAYS.

ASSUMING THAT EAST FOUNDRY COVE MARSH IS REMEDIATED, IN ADDITION TO THE FACT THAT SIGNIFICANT LEVELS OF CONTAMINATION WILL BE REMOVED FROM THE SOURCE, NATURAL PROCESSES MAY RESULT IN THE DEPOSITION OF CLEAN SEDIMENT OVER THE CONTAMINATED SEDIMENT IN EAST FOUNDRY COVE AND IN CONSTITUTION MARSH, AS WELL. IN GENERAL, SUBSTRATE DEPOSITION IN ESTUARINE MARSHES KEEPS PACE WITH THE RISE, WHICH IS APPROXIMATELY 3 MILLIMETERS PER YEAR (RENWIER AND ASHLEY, 1984). IN TIME, THEREFORE, THE CONTAMINATED ZONE MAY BE SANDWICHED BETWEEN LAYERS OF LOW PERMEABLE MATERIAL AND BECOME HYDROLOGICALLY ISOLATED. AVAILABILITY OF THIS REMAINING CADMIUM TO PLANT LIFE AND OTHER BIOTA SHOULD DECREASE WITH TIME AS MARSH SEDIMENTS BECOME COVERED WITH SEDIMENTS.

IN VIEW OF THE EXTENSIVE POTENTIALLY DETRIMENTAL EFFECTS RESULTING FROM DREDGING AND REMOVAL OF CONTAMINATED SEDIMENTS FROM 40 HA OF THE CONSTITUTION MARSH, AS WELL AS THE DETERMINATION THAT CADMIUM LEVELS UP TO 900 MG/KG POSE NO HUMAN HEALTH CONCERN, THE NO-ACTION ALTERNATIVE IN CONSTITUTION MARSH BECOMES A VIABLE ALTERNATIVE FOR CONSIDERATION.

THE CADMIUM IN EAST FOUNDRY COVE MARSH IS HIGHLY AVAILABLE. AS A RESULT, NO ACTION IN EAST FOUNDRY COVE MARSH WOULD ALLOW A SIGNIFICANT AMOUNT OF CADMIUM CONTAMINATION TO REMAIN, PRESENTING A CONTINUING THREAT TO THE ENVIRONMENT AND PUBLIC HEALTH. ACCORDINGLY, NO ACTION IS INAPPROPRIATE FOR THIS SUB-SITE, AND HAS BEEN DELETED FROM FURTHER CONSIDERATION. IN CONSTITUTION MARSH, THE CADMIUM IS LESS AVAILABLE THAN IN EAST FOUNDRY COVE MARSH. BECAUSE OF THE POTENTIALLY SIGNIFICANT DISRUPTION OF A SENSITIVE ECOSYSTEM BY IMPLEMENTING A REMEDIAL ALTERNATIVE IN CONSTITUTION MARSH, NO ACTION WOULD BE THE LEAST DAMAGING REMEDIAL ALTERNATIVE IN TERMS OF ENVIRONMENTAL IMPACTS.

II. HYDRAULIC DREDGING/THICKENING/FIXATION/OFF-SITE DISPOSAL:

ALTERNATIVE ECM-2

THE MAJOR FEATURES OF THIS ALTERNATIVE INCLUDE HYDRAULIC DREDGING OF EAST FOUNDRY COVE MARSH, SEDIMENT CHEMICAL FIXATION AND OFF-SITE DISPOSAL, DREDGING WATER TREATMENT AND DISPOSAL, RESTORATION OF THE MARSH, AND LONG-TERM MONITORING.

HYDRAULIC DREDGING OVER AN AREA OF APPROXIMATELY 5 HA IN EAST FOUNDRY COVE MARSH WOULD BE PERFORMED TO REMOVE CONTAMINATED SEDIMENT TO A DEPTH OF APPROXIMATELY 0.6 M FROM THE MARSH, OUTFALL AREA, AND CHANNELS, AS WELL AS THE AREA IN EAST FOUNDRY COVE IN THE VICINITY OF THE CHANNEL OUTLET ENCOMPASSED BY THE 1000 MG/KG ISOPLETHS OF SURFICIAL CADMIUM (SEE FIGURE 9.). HYDRAULIC DREDGES, ABLE TO REMOVE AND TRANSPORT SEDIMENT IN LIQUID SLURRY FORM CONTAINING APPROXIMATELY 10-20% SOLIDS, REQUIRE THAT A 2 M WATER DEPTH BE MAINTAINED FOR MOBILITY. IN ORDER TO MAINTAIN THE REQUIRED WATER DEPTH, A CONTAINMENT DIKE APPROXIMATELY 1000 M LONG AND 2.5 M HIGH, WITH 3:1 SIDE SLOPES WOULD BE CONSTRUCTED TO SURROUND EAST FOUNDRY COVE MARSH. THIS EARTH CONTAINMENT DIKE WOULD ALSO CONTAIN SEDIMENTS GENERATED DURING DREDGING, AND PROVIDE TRUCK ACCESS AROUND THE SITE. IN ADDITION, A SILT CURTAIN WOULD BE CONSTRUCTED AROUND THE DREDGING SITE TO CONTAIN SUSPENDED SEDIMENTS DURING DIKE CONSTRUCTION.

FOLLOWING FLOODING, THE MARSH VEGETATION WOULD BE HARVESTED IN ORDER TO REDUCE THE VEGETATION IN THE DREDGE AREA. THE HARVESTED VEGETATION WOULD BE DUMPED ONTO A CONVEYOR THAT WOULD LOAD IT DIRECTLY TO TRUCKS FOR TRANSPORT TO AN APPROPRIATE DISPOSAL FACILITY. WHETHER THIS FACILITY IS A SANITARY LANDFILL OR A HAZARDOUS WASTE DISPOSAL FACILITY WILL BE DETERMINED AFTER AN ANALYSIS OF THE VEGETATION TO DETERMINE WHETHER OR NOT IT CAN BE CONSIDERED HAZARDOUS.

FINALLY, THE ROOT MAT AND SEDIMENTS WOULD BE REMOVED. APPROXIMATELY 23,000 M3 OF SEDIMENTS WOULD BE REMOVED FROM EAST FOUNDRY COVE MARSH OVER A PERIOD OF ABOUT FOUR TO FIVE MONTHS. THE PUMPING RATE OF THE WATER-SEDIMENT DREDGE SLURRY WITH APPROXIMATELY 20% SOLIDS WOULD BE APPROXIMATELY 63 LITERS PER SECOND.

THE DREDGED SLURRY WOULD BE PUMPED THROUGH A FLOATING PIPING SYSTEM TO A TREATMENT SYSTEM LOCATED ON THE FORMER BATTERY FACILITY PROPERTY. AFTER THICKENING, THE SEDIMENT WOULD BE CHEMICALLY FIXATED.

BASED UPON THE BENCH SCALE TESTS PERFORMED BY TWO COMPANIES ON THE CONTAMINATED SEDIMENTS, TWO POSSIBLE FIXATION PROCESS SCENARIOS WERE CONSIDERED.

THE "CHEMFIX" PROCESS, DEVELOPED AND PATENTED BY CHEMFIX TECHNOLOGIES, INCORPORATED, IS BASED UPON A CHEMICAL TREATMENT UTILIZING THICKENED/DEWATERED SEDIMENTS, DRY REAGENT, AND LIQUID REAGENT. THE DRY REAGENT IS MADE FROM CLAY AND LIMESTONE AND IS SIMILAR TO PORTLAND CEMENT. THE LIQUID REAGENT IS MADE FROM HIGH PURITY BEACH SAND AND SODA ASH WHICH HAS BEEN PULVERIZED, CALCINATED AND DISSOLVED IN WATER.

IN THIS PROCESS SCENARIO, THE SEDIMENT AND DRY REAGENT WOULD BE THOROUGHLY BLENDED IN A HIGH POWERED MILL. AFTER COMPLETION OF THE BLENDING, THE LIQUID REAGENT WOULD BE INJECTED INTO THE MASS, FOLLOWED BY FURTHER BLENDING. AT THIS POINT, A RAPID CHEMICAL REACTION WOULD OCCUR, TRANSFORMING THE PRODUCT INTO A GEL THAT BINDS THE METALS WITHIN ITS MATRIX. THE GEL HAS A FRIABLE, CLAY-LIKE APPEARANCE.

THE SECOND OF BENCH SCALE TESTS WAS PERFORMED BY ASSOCIATED CHEMICAL AND ENVIRONMENTAL SERVICES. IN THIS PROCESS, MEASURED QUANTITIES OF WASTE CONTAMINATED SEDIMENT AND FLY ASH WOULD BE INTRODUCED INTO A MIXING UNIT. A ROTATING MIXING BLADE WOULD BE INTRODUCED INTO THE MIXER FOR A BRIEF PERIOD, THEN REMOVED. A SPECIFIED AMOUNT OF LIME WOULD BE ADDED, FOLLOWED BY A SECOND SLIGHTLY LONGER MIXING PERIOD. A MATERIAL OF DAMP SOIL CONSISTENCY WOULD BE PRODUCED WHICH WOULD BIND THE METALS WITHIN ITS MATRIX.

FOR BOTH PROCESSES, EP TOXICITY TESTS WERE PERFORMED ON THE PRODUCT, INDICATING THAT THE PRODUCT WAS NOT HAZARDOUS.

AFTER FIXATION, 47,000 M3 OF THE PROCESSED SEDIMENTS WOULD BE LOADED ONTO TRUCKS FOR TRANSPORT TO A LOCAL SANITARY LANDFILL AS EITHER A DAILY COVER OR AS A WASTE.

THE SUPERNATANT FROM THE THICKENERS WOULD BE PUMPED INTO CLARIFIER TANKS WHERE ALUM AND POLYMER WOULD BE ADDED AND MIXED IN ORDER TO PRECIPITATE THE SUSPENDED SOLIDS. THE CLARIFIED SUPERNATANT WOULD THEN BE DECANTED, TESTED, AND RETURNED TO THE DREDGING CELL VIA A PUMPING SYSTEM. THE SETTLED SOLIDS FROM THE CLARIFIERS WOULD BE PUMPED BACK TO THE THICKENER TANKS AND BE TREATED IN THE SAME MANNER AS THE CONTAMINATED SEDIMENTS.

AFTER COMPLETION OF THE HYDRAULIC DREDGING OPERATION, THE MARSH WOULD BE RESTORED BY REPLACEMENT OF SEDIMENT AND REPLANTING OF VEGETATION.

REPLACEMENT OF THE SEDIMENTS WOULD BE ACCOMPLISHED BY BACKFILLING OF THE MARSH WITH APPROXIMATELY 0.3 M OF CLAY HAVING A HIGH AFFINITY FOR CADMIUM AND 0.3 M OF TOPSOIL. THIS PROCESS WOULD REQUIRE APPROXIMATELY 14,000 M3 OF CLAY AND APPROXIMATELY 14,000 M3 OF TOPSOIL TO REPLACE THE MARSH TO APPROXIMATELY ITS ORIGINAL ELEVATION. THE CONTAINMENT DIKE WOULD BE USED AS A PORTION OF THE BACKFILL MATERIAL. REVEGETATION OF THE MARSH WOULD FOLLOW.

TO MINIMIZE THE DISTURBANCE OF THE REPLACED SEDIMENTS IN EAST FOUNDRY COVE MARSH, THE STORM SEWERS WOULD BE DIVERTED IN THE SAME MANNER AS DESCRIBED IN ALTERNATIVE ECM-1.

IN ORDER TO EVALUATE THE PERFORMANCE OF THIS REMEDIAL ACTION, A LONG-TERM MONITORING PROGRAM WOULD BE IMPLEMENTED. IT WOULD CONSIST OF ANNUAL SITE INSPECTION, AS WELL AS SAMPLING AND TESTING OF SEDIMENTS AND WATER. SAMPLING/TESTING WOULD BE PERFORMED EVERY THREE MONTHS DURING THE FIRST POSTCONSTRUCTION YEAR AND EVERY SIX MONTHS THEREAFTER FOR A PERIOD OF THIRTY YEARS.

ALTERNATIVE CM-2:

THE MAJOR FEATURES OF THIS ALTERNATIVE ARE HYDRAULIC DREDGING OF THE MARSH, SEDIMENT CHEMICAL FIXATION AND DISPOSAL OFF-SITE, DREDGING WATER TREATMENT AND DISPOSAL, MARSH RESTORATION, AND LONG-TERM MONITORING.

HYDRAULIC DREDGING WOULD BE PERFORMED TO REMOVE CONTAMINATED SEDIMENTS TO A DEPTH OF APPROXIMATELY 0.3 M. MOST OF THE FEATURES ASSOCIATED WITH DREDGING IN CONSTITUTION MARSH ARE ESSENTIALLY THE SAME AS DISCUSSED PREVIOUSLY.

THE TOTAL AREA OF THE CONSTITUTION MARSH IS APPROXIMATELY 117 HA. THE AREA TO BE DREDGED TO CLEAN UP THE SEDIMENTS WITH CADMIUM CONCENTRATIONS ABOVE 100 MG/KG IS APPROXIMATELY 40 HA IN THE NORTHERN PORTION OF THE MARSH.

IN THIS OPERATION, THE DREDGE AREA WOULD BE DIVIDED INTO TWO CELLS IN ORDER TO MAINTAIN TIDAL FLOW BETWEEN CONSTITUTION MARSH AND FOUNDRY COVE. EACH CELL WOULD BE APPROXIMATELY 20 HA, AND DREDGING WOULD BE PERFORMED IN ONE CELL AT A TIME. THE CELL WOULD BE ENCLOSED BY AN 2.4 M EARTHEN DIKE 4 M WIDE AT THE TOP WITH 3:1 SLOPES IN ORDER TO MAINTAIN A LEVEL OF 1 M OF WATER IN THE CELL. OUTSIDE THE DIKE, A SILT CURTAIN WOULD BE ERECTED TO CONTAIN THE TRANSPORT OF SEDIMENTS OUTSIDE THE CELL DURING DIKE CONSTRUCTION AND DREDGING.

AS THE SEDIMENT IS DREDGED, THE SLURRY WOULD BE PUMPED THROUGH A FLOATING PIPING SYSTEM TO AN ON-SITE TREATMENT FACILITY. IT IS ANTICIPATED THAT APPROXIMATELY 120,000 M3 OF SEDIMENTS WOULD BE DREDGED FROM THE MARSH. CONSIDERING THE 10-20% SOLIDS CONTENT OF THE DREDGED SLURRY, IT IS ESTIMATED THAT APPROXIMATELY 600,000 M3 OF SLURRY WOULD BE GENERATED. THE TREATMENT FOR THE SEDIMENT AND THE DREDGING WATER WOULD BE THE SAME AS INDICATED PREVIOUSLY.

THE FIXATED SEDIMENTS, WHICH WOULD AMOUNT TO APPROXIMATELY 250,000 M3, WOULD BE DISPOSED OF OFF-SITE IN A LOCAL LANDFILL AS DESCRIBED PREVIOUSLY.

AFTER COMPLETION OF THE DREDGING IN THE CELL, CLEAN FILL WOULD BE DEPOSITED TO ATTAIN PREDREDGING CONTOURS TO THE MAXIMUM EXTENT POSSIBLE. AS MUCH OF THE DREDGED AREA WOULD BE REPLANTED WITH CATTAIL-ARROW ARUM AS IS PRACTICAL.

THE AQUEOUS TREATMENT SYSTEM FOR SUPERNATANT FROM THE THICKENERS WOULD BE THE SAME AS DESCRIBED PREVIOUSLY.

THE MARSH RESTORATION PROCEDURES AND LONG-TERM SITE MONITORING WOULD BE THE SAME AS DESCRIBED PREVIOUSLY.

DISCUSSION

THE REMOVAL OF THE BULK OF THE CADMIUM SOURCE FROM EAST FOUNDRY COVE MARSH WOULD ELIMINATE A SIGNIFICANT SOURCE OF CONTAMINATED SEDIMENT BEING TRANSPORTED TO FOUNDRY COVE AND CONSTITUTION MARSH. THE MEAN CONCENTRATION OF CADMIUM IN EAST FOUNDRY COVE MARSH SEDIMENT IS ABOUT 28,000 MG/KG, COMPARED TO ABOUT 1100 AND 180 MG/KG IN SEDIMENTS OF FOUNDRY COVE AND CONSTITUTION MARSH, RESPECTIVELY.

DREDGING IN EAST FOUNDRY COVE MARSH WOULD ACHIEVE SEDIMENT CADMIUM CONCENTRATIONS OF 100 MG/KG OR LESS. SINCE MOST OF THE DREDGED AREA WOULD BE RECONTOURED WITH CLAY AND CLEAN FILL, THE RESIDUAL CADMIUM SHOULD BE ISOLATED FROM HYDROLOGIC AND BIOLOGIC PROCESSES. DREDGING OF CONTAMINATED SEDIMENTS, THEREFORE, WOULD REMOVE WHAT IS BELIEVED TO BE THE PRIMARY SOURCE OF CADMIUM WHICH IS CURRENTLY EXPOSING THE LARGER CONSTITUTION MARSH COMPLEX TO POTENTIAL TOXIC EFFECTS. IT WOULD ALSO MINIMIZE POSSIBLE DIRECT CONTACT OF FISH AND WILDLIFE WITH HIGHLY CONTAMINATED SEDIMENTS.

REMOVAL OF THE EAST FOUNDRY COVE MARSH, HOWEVER, WOULD DESTROY APPROXIMATELY 5 HA OF CATTAIL-ARROW ARUM HABITAT. THIS AREA, HOWEVER, IS CONSIDERED SMALL RELATIVE TO THE 117 HA SIMILAR HABITAT IN CONSTITUTION MARSH. EFFECTS FROM THE LOST MARSH WILL BE LARGELY TEMPORARY, AS A CATTAIL-ARROW ARUM MARSH WOULD BE RECONSTRUCTED ON THE SAME LOCATION AFTER RECONTOURING WITH CLEAN FILL. THE RE-ESTABLISHED MARSH WOULD SUPPORT LOWER DENSITIES OF PLANTS AND WOULD CONTAIN LESS UNDERLYING ORGANIC MUCK. IT WOULD BE LESS PRODUCTIVE AND LESS EFFECTIVE AS A SEDIMENT TRAP, BUT BOTH THESE FUNCTIONS WOULD, WITH TIME, TEND TO APPROACH PRE-CLEANUP LEVELS.

ONE OF THE PRIMARY CONCERNS ASSOCIATED WITH REVEGETATING THE MARSH IS THE POTENTIAL THAT THE REVEGETATION

WILL NOT BE SUCCESSFUL. ARROW ARUM IS CURRENTLY THE DOMINANT SPECIES IN THE MARSH. A MODIFICATION IN THE ECOLOGICAL NATURE OF THE MARSH MAY OCCUR, HOWEVER, SINCE CATTAILS TEND TO SPREAD FASTER THAN ARUM. IN ADDITION, UNLESS THE ORGANIC CONTENT OF THE REPLACEMENT SOILS IS SIMILAR TO THE EXCAVATED SEDIMENTS, IT IS POSSIBLE THAT THE ABILITY FOR THE CATTAILS AND ARROW ARUM TO SPREAD MAY BE IMPEDED. IT IS BELIEVED THAT MAINTENANCE AND HANDCUTTING FOR ONE TO TWO YEARS, HOWEVER, WILL PREVENT UNDESIRABLE PLANT SPECIES FROM ESTABLISHING THEMSELVES (ERT, 1986), IMPROVING THE LIKELIHOOD THAT ARROW ARUM WILL REESTABLISH ITSELF. DESPITE THE CONCERNS, IT IS BELIEVED THAT THE RISK OF FAILURE TO REVEGETATE THE MARSH IS SMALL.

SINCE THE EXISTING SEDIMENT CONTOURS WOULD BE REPLACED, REMEDIATING EAST FOUNDRY COVE MARSH WOULD NOT APPRECIABLY IMPACT THE EXCHANGE OF TIDAL WATERS BETWEEN FOUNDRY COVE AND CONSTITUTION MARSH. IN ADDITION, NO LONG-TERM MAJOR IMPACTS ON WETLAND COMMUNITIES ARE ANTICIPATED AS A RESULT OF INTERFERING WITH THE EAST FOUNDRY COVE MARSH.

IMPACTS ASSOCIATED WITH REMOVAL OF 40 HA OF MOSTLY CATTAIL VEGETATION IN CONSTITUTION MARSH MAY BE EXTENSIVE. ALMOST HALF OF THE NESTING AREA AVAILABLE FOR LEAST BITTERN, A NEW YORK STATE SPECIES OF "SPECIAL CONCERN," COULD BE TEMPORARILY ELIMINATED. THE QUALITY OF UNDREDGED PORTIONS OF THE CATTAIL MARSH AS NESTING HABITAT WOULD LIKELY BE REDUCED DUE TO INCREASED HUMAN ACTIVITIES OCCURRING OVER AT LEAST A TWO YEAR PERIOD. WATERFOWL USE OF THE SITE AS A RESTING AREA DURING SPRING AND FALL MIGRATION COULD BE SIMILARLY AFFECTED. A SMALL PORTION OF THE DREDGED AREA INCLUDES FLOATING MATS OF CATTAIL, WHICH ARE AN UNUSUAL FEATURE FOUND IN TIDAL MARSHES. RESTORATION OF SUCH FLOATING MATS IS PROBABLY NOT POSSIBLE. DIKE CONSTRUCTION MAY RESUSPEND CONTAMINATED PARTICULATES, INCREASING EXPOSURE TO AQUATIC AND WETLAND BIOTA (EBASCO FS, 1986).

REMOVAL OF THE EXTREMELY HIGH LEVELS OF CONTAMINATED SEDIMENTS FROM EAST FOUNDRY COVE MARSH AS CALLED FOR IN ALTERNATIVE ECM-2 WOULD ELIMINATE FURTHER TRANSPORT OF HIGHLY CONTAMINATED SEDIMENTS TO EAST FOUNDRY COVE AND CONSTITUTION MARSH, SIGNIFICANTLY REDUCING THE CADMIUM AVAILABILITY TO THE BIOTA.

IT IS BELIEVED THAT IMPLEMENTATION OF ALTERNATIVE CM-2 WOULD CAUSE EXTENSIVE ENVIRONMENTAL DEGRADATION IN CONSTITUTION MARSH FAR OUTWEIGHING THE BENEFITS THAT WOULD BE REALIZED BY DREDGING AND REMOVAL OF THE CONTAMINATED SEDIMENTS. THE DREDGING AND REMOVAL OPTIONS REQUIRE DIVERSION OF TIDAL WATERS AROUND THE WORK AREAS, AFFECTING TIDAL FLOW PATTERNS. IF RESTORATION DOES NOT ACHIEVE PRE-CLEANUP CONDITIONS AND CONTOURS, THE EXISTING TIDAL FLOW PATTERNS MAY NOT RETURN. THIS WOULD ADVERSELY AFFECT THE ENTIRE CONSTITUTION MARSH. EVEN THOUGH REVEGETATION OF THE 40 HA MARSH WOULD BE ATTEMPTED, IT MAY PROVE EXTREMELY DIFFICULT BY VIRTUE OF THE EXTENSIVE AREA INVOLVED. BECAUSE OF THE NEED TO INSTALL ACCESS ROADS, EVEN THE REMOVAL OF THE HOT SPOT AREAS IN CONSTITUTION MARSH MAY RESULT IN SIGNIFICANT ENVIRONMENTAL IMPACTS. CONSTITUTION MARSH IS AN IMPORTANT RESOURCE, AND ANY POTENTIAL LOSS OF ALL OR A PART OF IT WOULD BE VERY DIFFICULT TO JUSTIFY. FOR THE FOREGOING REASONS, ALTERNATIVE CM-2 WAS DELETED FROM FURTHER CONSIDERATION.

III. HYDRAULIC DREDGING/THICKENING/FIXATION/ON-SITE DISPOSAL:

ALTERNATIVE ECM-3

THE MAJOR FEATURES OF THIS ALTERNATIVE INCLUDE HYDRAULIC DREDGING OF EAST FOUNDRY COVE MARSH, SEDIMENT CHEMICAL FIXATION AND ON-SITE DISPOSAL, DREDGING WATER TREATMENT AND DISPOSAL, RESTORATION OF THE MARSH, AND LONG-TERM MONITORING.

THIS SOURCE CONTROL ALTERNATIVE IS EXACTLY THE SAME AS ALTERNATIVE ECM-2 EXCEPT THAT THE FIXATED SEDIMENTS WILL BE DISPOSED OF ON-SITE.

UNDER THIS ALTERNATIVE, RATHER THAN OFF-SITE DISPOSAL, THE FIXATED SEDIMENT WOULD BE TRANSPORTED FROM THE CURING AREA TO A 2.7 HA LANDFILL CONSTRUCTED ON-SITE, FOR DISPOSAL. WHILE AN ON-SITE, NON-RCRA DISPOSAL FACILITY WOULD BE VIABLE, AS AN ADDED MEASURE OF PROTECTION TO PUBLIC HEALTH AND THE ENVIRONMENT, THE LANDFILL WOULD BE CONSTRUCTED IN ACCORDANCE WITH RCRA REQUIREMENTS FOR HAZARDOUS WASTE LANDFILLS. IT WOULD CONTAIN A DOUBLE LINER, INCLUDING LEACHATE COLLECTION AND LEAK DETECTION SYSTEMS, AND A RCRA CAP WOULD BE PLACED OVER THE LANDFILL FOLLOWING COMPLETION OF DISPOSAL OPERATIONS. THE TOTAL FIXATED VOLUME TO BE DISPOSED OF FROM EAST FOUNDRY COVE MARSH WOULD BE APPROXIMATELY 47,000 M3.

UNDER THIS ALTERNATIVE, THE STORM SEWERS WOULD BE DIVERTED IN THE SAME MANNER AS DESCRIBED IN ALTERNATIVE

ECM-1.

LONG-TERM MONITORING OF THE SITE AND THE RCRA LANDFILL WOULD FOLLOW COMPLETION OF THE RESTORATION OF THE SITE.

DISCUSSION

BECAUSE OF THE SENSITIVE WETLAND AND HISTORIC AREAS, THE ONLY SITE AVAILABLE WITH ADEQUATE SIZE FOR ON-SITE DISPOSAL WOULD BE THE FORMER BATTERY PLANT GROUNDS.

THE LANDFILL DESIGN CONSISTS OF A CLAY LINER, SYNTHETIC LINERS, CAPPING WITH RUNOFF COLLECTION AND DRAINAGE TO EAST FOUNDRY COVE. THIS DESIGN IS INTENDED TO ASSURE VIRTUALLY NO LEACHATE GENERATION. LOST RECHARGE TO THE AQUIFER, BECAUSE OF THE CAPPING AND DRAINAGE DESIGN, IS ESTIMATED TO BE EQUIVALENT TO LESS THAN 0.6 LITERS PER SEC.

THE FIXATED SEDIMENTS DERIVED FROM EAST FOUNDRY COVE MARSH MEET THE RCRA EP TOXICITY TEST AND WOULD BE "NON-HAZARDOUS.". CADMIUM CONCENTRATIONS IN TEST LEACHATE WERE LESS THAN 1 MG/KG. EVEN IF SUCH MATERIALS WERE DISPOSED OF IN UNLINED AND UNCAPPED LANDFILL, THE THREAT OF GROUNDWATER CONTAMINATION WOULD BE CONSIDERED RELATIVELY LOW.

BECAUSE OF THE VERY LOW SOLUBILITY AND MOBILITY OF FIXATED SEDIMENTS AND HIGH RELIABILITY OF RCRA-DESIGNED LANDFILLS, THE POTENTIAL OF GROUND-WATER CONTAMINATION IS CONSIDERED VERY SMALL.

THIS PROPOSED ON-SITE LANDFILL IS ESTIMATED TO BE ADEQUATE FOR THE FIXATED SEDIMENTS FROM EAST FOUNDRY COVE MARSH, BUT WOULD NOT, HOWEVER, BE ABLE TO ACCOMMODATE THE FIXATED SEDIMENTS FROM CONSTITUTION MARSH, OR EAST FOUNDRY COVE, WEST FOUNDRY COVE, AND THE COLD SPRING PIER AREA IF REMOVAL AND FIXATION OF SEDIMENTS FROM THESE AREAS IS REQUIRED.

BECAUSE THE LANDFILL WOULD BE CONSTRUCTED IN A RESIDENTIAL AREA, AND BECAUSE THE AVAILABLE AREA IS NOT SUFFICIENT TO ACCOMMODATE ANY DREDGED SEDIMENTS FROM THE REMAINING PORTIONS OF THE SITE, ON-SITE DISPOSAL FOR EAST FOUNDRY COVE MARSH MAY NOT BE CONSISTENT WITH OTHER ACTIONS EVENTUALLY SELECTED FOR OTHER PORTIONS OF THIS SITE. THEREFORE, THIS ALTERNATIVE WAS DELETED FROM FURTHER CONSIDERATION.

IV. HYDRAULIC DREDGING/SEDIMENT THICKENING AND DEWATERING/OFF-SITE DISPOSAL

ALTERNATIVE ECM-4:

THE MAJOR FEATURES OF THIS ALTERNATIVE INCLUDE HYDRAULIC DREDGING OF EAST FOUNDRY COVE MARSH, SEDIMENT THICKENING, DEWATERING AND OFF-SITE DISPOSAL, DREDGING WATER TREATMENT, RESTORATION OF THE MARSH, AND LONG-TERM MONITORING.

THIS ALTERNATIVE IS THE SAME AS ALTERNATIVE ECM-2 EXCEPT THAT THE SEDIMENT WOULD BE THICKENED AND DEWATERED, BUT NOT FIXATED. THE DEWATERED SEDIMENTS WOULD, THEREFORE, REMAIN AS HAZARDOUS WASTE AND WOULD BE DISPOSED OF OFF-SITE IN A PERMITTED HAZARDOUS WASTE FACILITY. THE DEWATERED SEDIMENT WOULD BE TRANSPORTED TO THE MODEL CITY, NEW YORK HAZARDOUS WASTE LANDFILL, APPROXIMATELY 640 KM FROM THE SITE. IT IS ESTIMATED THAT 23,000 M3 OF DEWATERED SEDIMENTS WOULD BE GENERATED OVER FOUR MONTHS. DISCUSSIONS WITH THE MODEL CITY FACILITY INDICATED THAT ADEQUATE CAPACITY IS AVAILABLE AND NO PROBLEM IS ANTICIPATED IN HANDLING CADMIUM/NICKEL/COBALT-CONTAMINATED SEDIMENTS.

THE AQUEOUS TREATMENT SYSTEM FOR EFFLUENT FROM THE THICKENERS WOULD BE THE SAME AS ECM-2. THE FILTRATE FROM THE DEWATERING VACUUM FILTERS WOULD BE PUMPED BACK TO THE THICKENERS.

UNDER THIS ALTERNATIVE, THE STORM SEWERS WOULD BE DIVERTED AS DESCRIBED IN ALTERNATIVE ECM-1.

LONG-TERM MONITORING WOULD FOLLOW COMPLETION OF THE RESTORATION OF THE SITE.

ALTERNATIVE CM-3:

THE MAJOR FEATURES OF THIS ALTERNATIVE INCLUDE HYDRAULIC DREDGING OF CONSTITUTION MARSH, SEDIMENT THICKENING, DEWATERING, AND OFF-SITE DISPOSAL, DREDGING WATER TREATMENT, MARSH RESTORATION, AND LONG-TERM MONITORING.

HYDRAULIC DREDGING OF CONSTITUTION MARSH WOULD BE THE SAME AS IN ALTERNATIVE CM-2.

THE SEDIMENT TREATMENT WOULD BE THE SAME AS IN ALTERNATIVE CM-2 EXCEPT THAT DEWATERING WOULD BE PERFORMED INSTEAD OF FIXATION. THE APPROXIMATELY 120,000 M3 OF DEWATERED SEDIMENTS, WHICH WOULD REMAIN AS A HAZARDOUS WASTE, WOULD BE LOADED ONTO TRUCKS AS DESCRIBED IN ALTERNATIVE ECM-2. IT WOULD THEN BE TRANSPORTED TO THE RCRA LANDFILL AT MODEL CITY, NEW YORK FOR DISPOSAL. MODEL CITY LANDFILL AUTHORITIES HAVE INDICATED THAT ADEQUATE CAPACITY IS AVAILABLE AND THAT THE DEWATERED SEDIMENTS CONTAMINATED WITH HEAVY METALS DO NOT POSE ANY PROBLEMS.

THE AQUEOUS TREATMENT SYSTEM FOR EFFLUENT FROM THE THICKENERS WOULD BE THE SAME AS IN ALTERNATIVE ECM-2. THE FILTRATE FROM THE DEWATERING VACUUM FILTERS WOULD BE PUMPED BACK TO THE THICKENERS. MARSH RESTORATION AND LONG-TERM MONITORING WOULD BE INCLUDED.

DISCUSSION

ACCORDING TO REGULATIONS PROMULGATED PURSUANT TO THE 1984 RCRA AMENDMENTS, PRIOR TO DISPOSAL, THE LIQUID CONTENT OF THE DEWATERED SEDIMENTS MUST BE DETERMINED. SINCE LONG-DISTANCE TRANSPORT OF THESE SEDIMENTS TO THE DISPOSAL FACILITY MIGHT CAUSE SEPARATION OF "FREE LIQUIDS" FROM THE SEDIMENTS, IT IS POSSIBLE THAT THE SEDIMENTS MIGHT NOT BE ACCEPTABLE FOR DISPOSAL AT THE FACILITY WHEN THEY ARRIVE (ERT, 1986).

WHILE THE COSTS ASSOCIATED WITH OFF-SITE DISPOSAL OF THE CADMIUM-CONTAMINATED SEDIMENTS ARE NOT SIGNIFICANTLY GREATER THAN FIXATION AND SANITARY LANDFILL DISPOSAL, THE POSSIBILITY OF HAULING LOSSES OF HAZARDOUS WASTES AND THE CONSUMPTION OF LIMITED OFF-SITE HAZARDOUS WASTE LANDFILL CAPACITY, AND THE POSSIBILITY THAT THE SEDIMENTS MAY NOT BE ACCEPTABLE FOR DISPOSAL, WARRANT THE ELIMINATION OF THESE ALTERNATIVES FROM FURTHER CONSIDERATION.

V. CONTAINMENT

ALTERNATIVE ECM-5:

THE MAJOR FEATURES OF THIS ALTERNATIVE INCLUDE CONTAINMENT OF THE UNDISTURBED SEDIMENTS IN-SITU, CONSTRUCTION OF A NEW MARSH ADJACENT TO THE CONTAINMENT AREA, AND LONG-TERM MONITORING OF THE SITE.

CONTAINMENT OF THE CONTAMINATED SEDIMENTS IN EAST FOUNDRY COVE MARSH WOULD BE ACCOMPLISHED BY CONSTRUCTION OF A 610 M LONG, 2.5 M HIGH CONTAINMENT DIKE ALONG THE SOUTHERN EDGE OF THE MARSH AND A MULTI-LAYER CAP CONSISTING OF:

- GEOTEXTILE LAYER (BOTTOM)
- 0.3 M GRAVEL LAYER
- 15 CM ARMORFORM LAYER
- 0.3 M TOPSOIL LAYER
- HYDRO-TURF LAYER AND GRASS (TOP).

AN OPEN FIELD HABITAT WOULD BE ESTABLISHED ON THE SURFACE OF THE CONTAINMENT AREA. A NEW MARSH OF EQUAL AREA, APPROXIMATELY 5 HA, WOULD BE CONSTRUCTED IN EAST FOUNDRY COVE ADJACENT TO THE CONTAINMENT AREA. THE NEW MARSH WOULD BE DEVELOPED IN GENERALLY THE SAME WAY AS PRESENTED IN ALTERNATIVE ECM-2.

LONG-TERM MONITORING WOULD CONSIST OF ANNUAL INSPECTION OF THE CAP AND RESTORED MARSH AS WELL AS SAMPLING AND TESTING OF SEDIMENTS AND WATER IN EAST FOUNDRY COVE. SAMPLING AND TESTING TO MONITOR SEDIMENT RELEASES FROM THE CONTAINMENT AREA AND TO EVALUATE CAP PERFORMANCE WOULD BE PERFORMED EVERY THREE MONTHS FOR THE FIRST YEAR FOLLOWING CONSTRUCTION. IT WOULD THEN BE PERFORMED EVERY SIX MONTHS FOR A PERIOD OF THIRTY YEARS.

DISCUSSION:

CONTAINMENT OF THE CONTAMINATED SEDIMENTS UNDERLYING EAST FOUNDRY COVE MARSH WOULD IMMOBILIZE THE CADMIUM WHICH IS THE SOURCE OF CADMIUM CURRENTLY BEING TRANSPORTED INTO EAST FOUNDRY COVE AND CONSTITUTION MARSH. CONTAINMENT WOULD ALSO PREVENT DIRECT EXPOSURE OF AQUATIC AND WETLAND BIOTA TO HIGHLY CONTAMINATED SEDIMENTS. CONTAINMENT, HOWEVER, IS NOT CONSIDERED AS RELIABLE AS REMOVAL, AND EXTENSIVE MONITORING OF THE CONTAINMENT STRUCTURE WOULD BE REQUIRED.

APPROXIMATELY 5 HA OF THE EAST FOUNDRY COVE MARSH CATTAIL-ARROW ARUM WOULD BE REPLACED BY THE OPEN FIELD HABITAT ESTABLISHED ON THE SURFACE OF THE CONTAINMENT AREA. THE EFFECTS ASSOCIATED WITH LOSS OF MARSH HABITAT WOULD BE MINIMIZED BY CONSTRUCTION OF AN ADDITIONAL CATTAIL-ARROW ARUM MARSH OF COMPARABLE AREA IN THE SOUTH SIDE OF EAST FOUNDRY COVE OR WEST OF THE RAILROAD EMBANKMENT IMMEDIATELY NORTH OF CONSTITUTION ISLAND. THIS NEW MARSH, HOWEVER, MAY INFLUENCE THE TIDAL FLOW PATTERNS WITHIN EAST FOUNDRY COVE, POSSIBLY ELIMINATING FLOW TO SOME AREAS AND INCREASING FLOW VELOCITY IN OTHER AREAS. THIS COULD INFLUENCE THE VOLUME OF HUDSON RIVER WATER EXCHANGED WITH THE NORTHERN PART OF CONSTITUTION MARSH. THERE IS SOME EVIDENCE THAT MARSH PRODUCTIVITY CORRELATES WITH TIDAL FLUSHING, AND THEREFORE, SUCH INTERFERENCE COULD NEGATIVELY IMPACT CONSTITUTION MARSH.

FROM THE ENVIRONMENTAL VIEWPOINT, THE CONTAINMENT ALTERNATIVES FOR EAST FOUNDRY COVE MARSH AND FOR EAST FOUNDRY COVE (SHOULD THIS ALTERNATIVE BE SELECTED IN THE SUBSEQUENT ROD) ARE NOT COMPATIBLE WITH EACH OTHER. IF BOTH AREAS ARE COVERED WITH ARMORMAT, BECAUSE OF THE IMPACT ON TIDAL FLOW TO CONSTITUTION MARSH, THE ENVIRONMENT MAY BE AFFECTED TO SUCH AN EXTENT THAT SEVERE ADVERSE ENVIRONMENTAL IMPACTS MAY RESULT.

BECAUSE OF THE POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE CONTAINMENT ALTERNATIVE, ALTERNATIVE ECM-5 HAS BEEN DELETED FROM FURTHER CONSIDERATION.

IT HAS BEEN SUGGESTED THAT PARTIAL REMOVAL OPTIONS WHICH WOULD INCLUDE LIMITED DREDGING WITHIN EAST FOUNDRY COVE MARSH, SO AS TO REDUCE THE POTENTIAL IMPACT ON THE EXISTING VEGETATION WHILE REMOVING THE HIGHLY CONTAMINATED SEDIMENTS FROM THE OUTFALL AND EXISTING FLOW CHANNELS, BE CONSIDERED. WHILE THIS OPERATION WOULD PROBABLY PROVIDE THE MAXIMUM CADMIUM REMOVAL PER CUBIC METER OF DREDGED SEDIMENT WHILE MINIMIZING THE SHORT-TERM ADVERSE EFFECTS OF A DREDGING OPERATION IN THE ENTIRE EAST FOUNDRY COVE MARSH AREA, IT WOULD ALLOW AREAS IN EAST FOUNDRY COVE MARSH WITH CONTAMINANT LEVELS IN THE TENS OF THOUSANDS TO REMAIN. IN ADDITION, IN THE EARLY 1970S, APPROXIMATELY 3,500 M3 OF CADMIUM-CONTAMINATED SEDIMENTS WITH CONCENTRATIONS GREATER THAN 900 MG/KG WERE REMOVED FROM THE OUTFALL AREA, CHANNELS, AND A PORTION OF EAST FOUNDRY COVE. SINCE IT IS BELIEVED THAT THE BATTERY FACILITY DID NOT DISCHARGE APPRECIABLE QUANTITIES OF CADMIUM CONTAMINATION TO FOUNDRY COVE AFTER THE DREDGING OPERATION, AND SINCE IT IS APPARENT THAT THIS DREDGING OPERATION WAS UNSUCCESSFUL IN ALLEVIATING THE CONTAMINATION PROBLEM, NOT ONLY WOULD THE THREAT TO THE ENVIRONMENT AND PUBLIC HEALTH REMAIN BY LIMITED DREDGING, BUT THE UNDREDGED CONTAMINATED SEDIMENT WOULD PROBABLY MIGRATE AND DEPOSIT IN THE CHANNEL AREAS, NECESSITATING FURTHER DREDGING.

TABLE 14 SUMMARIZES THE RESULTS OF THE ALTERNATIVE EVALUATION PROCESS, AND TABLE 15 SUMMARIZES THE ANNUAL OPERATION AND MAINTENANCE THE COSTS ASSOCIATED WITH THE REMEDIAL ALTERNATIVES.

#CR
COMMUNITY RELATIONS

THROUGHOUT THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY PROCESS, ALL DATA AND INFORMATION WERE MADE AVAILABLE TO THE PUBLIC VIA A PUBLIC REPOSITORY.

A PUBLIC MEETING WAS HELD IN THE MUNICIPAL BUILDING ON SEPTEMBER 26, 1985 TO DISCUSS THE RESULTS OF THE ACRES RI/FS.

AFTER PUBLICLY RELEASING THE DRAFT SUPPLEMENTAL RI/FS ON AUGUST 15, 1986, A PUBLIC MEETING WAS HELD ON AUGUST 26, 1986. THE PUBLIC MEETING, ANNOUNCED BY A PRESS RELEASE AND DIRECT MAILING, INDICATED THAT THE MEETING WAS TO BE HELD IN THE MUNICIPAL BUILDING AND THAT THE PUBLIC COMMENT PERIOD WOULD END ON SEPTEMBER 15, 1986. ATTACHED IS A LIST OF ATTENDEES. IN RESPONSE TO A REQUEST BY THE PRPS FOR AN EXTENSION OF THE PUBLIC COMMENT PERIOD, THE COMMENT PERIOD EXPIRATION DATE WAS EXTENDED TO SEPTEMBER 23, 1986.

A RESPONSIVENESS SUMMARY IS ATTACHED. THIS DOCUMENT SUMMARIZES THE COMMENTS ON THE SUPPLEMENTAL REMEDIAL

INVESTIGATION/FEASIBILITY STUDY REPORT, INCLUDES MEETING NOTIFICATION DOCUMENTS, AND SUMMARIZES THE PUBLIC MEETING COMMENTS AND RESPONSES TO THOSE COMMENTS (SEE ATTACHMENT 1).

#OEL
CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

THE RECOMMENDED REMEDIAL ALTERNATIVE COMPLIES WITH ALL SUBSTANTIAL REQUIREMENTS OF THE RESOURCE CONSERVATION AND RECOVERY ACT, THE CLEAN WATER ACT, AND THE CLEAN AIR ACT.

IN ADDITION, APPROPRIATE ACTIONS EITHER HAVE ALREADY BEEN TAKEN OR WILL BE TAKEN TO ENSURE THAT THE RECOMMENDED REMEDIAL ALTERNATIVE COMPLIES WITH THE REQUIREMENTS OF THE FOLLOWING ENVIRONMENTAL STATUTES AND EXECUTIVE ORDERS:

- ENDANGERED SPECIES ACT - TWO FEDERALLY LISTED ENDANGERED SPECIES (I.E., THE BALD EAGLE AND THE SHORTNOSE STURGEON) ARE KNOWN TO BE TRANSIENT INHABITANTS IN THE VICINITY OF THE MARATHON BATTERY COMPANY SITE. IN ORDER TO ENSURE THAT THESE SPECIES ARE NOT ADVERSELY IMPACTED BY THE RECOMMENDED REMEDIAL ALTERNATIVE, INFORMAL CONSULTATION PURSUANT TO SECTION 7 OF THE ENDANGERED SPECIES ACT WILL BE INITIATED AS SOON AS POSSIBLE. BASED ON THE RESULTS OF THE INFORMAL CONSULTATION, FORMAL CONSULTATION AND THE DEVELOPMENT OF APPROPRIATE MITIGATION MEASURES WILL BE DEVELOPED, IF NECESSARY, DURING THE REMEDIAL DESIGN OF THE PROJECT.

- NATIONAL HISTORIC PRESERVATION ACT - THERE ARE SEVERAL PROPERTIES IN THE VICINITY OF THE MARATHON BATTERY COMPANY SITE THAT ARE LISTED ON THE NATIONAL REGISTER OF HISTORIC PLACES. IN ADDITION, THERE IS A HIGH PROBABILITY THAT THE AREA SURROUNDING THE SITE CONTAINS SIGNIFICANT PREHISTORIC RESOURCES. IN ORDER TO PROPERLY ASSESS THE IMPACT OF THE PROJECT ON SIGNIFICANT CULTURAL RESOURCES, A CULTURAL RESOURCES SITE RECOGNITION SURVEY WILL BE PERFORMED DURING REMEDIAL DESIGN. IF SIGNIFICANT CULTURAL RESOURCES WILL BE IMPACTED BY THE PROJECT, APPROPRIATE MITIGATION MEASURES WILL BE DEVELOPED AND IMPLEMENTED PRIOR TO INITIATION OF CONSTRUCTION.

- COASTAL ZONE MANAGEMENT ACT - THE MARATHON BATTERY COMPANY SITE IS LOCATED WITHIN THE COASTAL ZONE AS DESIGNATED IN THE NEW YORK STATE COASTAL ZONE MANAGEMENT PLAN. ACCORDINGLY, A DETERMINATION OF THE PROJECT'S CONSISTENCY WITH THIS PLAN WILL BE OBTAINED FROM THE NEW YORK DEPARTMENT OF STATE PRIOR TO THE INITIATION OF THE CONSTRUCTION PHASE OF THE PROJECT.

- EXECUTIVE ORDER 11990 (WETLANDS PROTECTION) - THE RECOMMENDED REMEDIAL ALTERNATIVE INCLUDES THE DREDGING OF SEVERAL HECTARES OF WETLANDS. A DETAILED WETLANDS RESTORATION PLAN WILL BE DEVELOPED DURING REMEDIAL DESIGN AND IMPLEMENTED DURING CONSTRUCTION TO MITIGATE THIS ADVERSE IMPACT.

- EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT) - THE MARATHON BATTERY COMPANY SITE LIES WITHIN THE 100 YEAR FLOODPLAIN AS DESIGNATED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. THE RECOMMENDED REMEDIAL ACTION REQUIRES THE UNAVOIDABLE ENCROACHMENT ON THE FLOODPLAIN, HOWEVER, THE PROJECT WILL NOT RESULT IN LONG-TERM ADVERSE IMPACTS ON THE FLOODPLAIN OR FLOODING LEVELS.

BASED ON THE ABOVE, AND THE ACTIONS TAKEN DURING THE PREPARATION OF THE RI/FS FOR THIS PROJECT, EPA HAS DETERMINED THAT THE REVIEW OF THIS PROJECT IS FUNCTIONALLY EQUIVALENT WITH THE REQUIREMENTS OF THE NATIONAL ENVIRONMENTAL POLICY ACT.

#RA
RECOMMENDED ALTERNATIVE

ACCORDING TO 40 CFR PART 300.68(I), THE APPROPRIATE EXTENT OF A REMEDY WILL BE BASED UPON THE SELECTION OF A COST-EFFECTIVE REMEDIAL ALTERNATIVE WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGE TO AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE, AND THE ENVIRONMENT. EIGHT ALTERNATIVES, INCLUDING TWO NO-ACTION ALTERNATIVES, WERE EVALUATED. BASED UPON THE ABOVE ANALYSIS OF THESE ALTERNATIVES, ALTERNATIVE ECM-2, HYDRAULIC DREDGING, SEDIMENT THICKENING, FIXATION, AND OFF-SITE DISPOSAL IS RECOMMENDED AS THE MOST COST-EFFECTIVE REMEDIAL MEASURE FOR EAST FOUNDRY COVE MARSH. ALTERNATIVE CM-1, NO ACTION, IS RECOMMENDED FOR CONSTITUTION MARSH.

WHILE THE BENCH SCALE TREATABILITY TESTING OF FIXATION PROCESSES INDICATE THAT THE HEAVY METALS IN QUESTION CAN BE TIED UP IN THE MATRIX CREATED BY THIS PROCESS, DURING THE DESIGN PHASE, PILOT-SCALE STUDIES WILL BE PERFORMED TO QUANTIFY BETTER THE EFFECTIVENESS AND PRODUCTION RATES OF A LARGE SCALE TREATMENT OPERATION.

BECAUSE OF THE UNIQUE EDUCATIONAL AND SCIENTIFIC OPPORTUNITIES PRESENTED BY REMEDIATING THE EAST FOUNDRY COVE MARSH PORTION OF THE SITE, IT IS RECOMMENDED THAT AN INTERPRETATION CENTER BE ESTABLISHED AT THE SITE SO THAT INTERESTED MEMBERS OF THE PUBLIC AND THE SCIENTIFIC COMMUNITY CAN VISIT THE SITE DURING AND AFTER SITE REVEGETATION.

#OM
OPERATION AND MAINTENANCE

MAINTENANCE AND HAND-CUTTING WILL BE REQUIRED FOR AT LEAST ONE TO TWO YEARS TO PREVENT THE INVASION AND/OR ESTABLISHMENT OF UNDESIRABLE PLANT SPECIES. BESIDES CONTINUED MONITORING FOR THIRTY YEARS, THERE ARE NO OTHER LONG-TERM OPERATION AND MAINTENANCE REQUIREMENTS ASSOCIATED WITH THESE ALTERNATIVES SINCE THE SOURCE WILL BE REMOVED.

#SCH
SCHEDULE

ACTIVITY	DATE
- FINAL RECORD OF DECISION	SEPTEMBER 30, 1986
- AMEND MEMORANDUM OF UNDERSTANDING (MOU) FOR DESIGN	OCTOBER 31, 1986
- START DESIGN	NOVEMBER 30, 1986
- COMPLETE DESIGN	AUGUST 31, 1987
- AMEND MOU FOR CONSTRUCTION	SEPTEMBER 30, 1987
- SOLICIT CONSTRUCTION PROPOSALS	OCTOBER 31, 1987
- AWARD CONTRACT FOR CONSTRUCTION	JANUARY 1, 1988
- START CONSTRUCTION	MARCH 31, 1988
- COMPLETE CONSTRUCTION	MARCH 31, 1991.

#FA
FUTURE ACTIONS

UPON COMPLETION OF THE SUPPLEMENTAL RI/FS FOR WEST FOUNDRY COVE, THE HUDSON RIVER IN THE VICINITY OF THE COLD SPRING PIER, AND THE FORMER BATTERY MANUFACTURING FACILITY PORTION OF THE SITE, AND BIOASSAY WORK IN EAST FOUNDRY COVE, A ROD WILL BE PREPARED TO RECOMMEND A REMEDIAL SOLUTION FOR THIS PORTION OF THE SITE.

TO BETTER CHARACTERIZE THE LINK BETWEEN THE LEVELS OF CADMIUM CONTAMINATION IN EAST FOUNDRY COVE SEDIMENTS AND BIOACCUMULATION IN AQUATIC FAUNA, BIOASSAY WORK WILL BE PERFORMED IN EAST FOUNDRY COVE.

BECAUSE THE BATTERY PLANT DISCHARGED FOR A NUMBER OF YEARS INTO THE HUDSON RIVER VIA THE OUTFALL AT THE COLD SPRING PIER, ONLY A LIMITED SAMPLING PROGRAM WAS CONDUCTED IN THIS AREA. IT WAS BELIEVED, AT THAT TIME, THAT SINCE THE RIVER AT THIS POINT FLOWS AT A SIGNIFICANT VELOCITY, LITTLE OR NO HEAVY METAL CONTAMINATION WOULD BE DETECTED IN THIS AREA. SEDIMENT CONTAMINANT LEVELS RANGING FROM LESS THAN ONE TO 2200 MG/KG WERE DETECTED, HOWEVER, SINCE THERE IS NO CLEAR DEFINITION OF THE EXTENT OF THE CONTAMINATION IN THIS AREA, ADDITIONAL SAMPLING IN THE HUDSON RIVER WILL BE PERFORMED.

IN WEST FOUNDRY COVE A SIMILAR SITUATION EXISTS WITH THE AVAILABLE INFORMATION BEING TOO RESTRICTIVE TO ENABLE THE COSTING AND RANKING OF ALTERNATIVES. CORES NEED TO BE TAKEN FARTHER OUT INTO THE HUDSON RIVER AND FARTHER TO THE SOUTH CLOSER TO CONSTITUTION ISLAND.

ADDITIONAL SAMPLING IS ALSO NECESSARY IN THE FORMER BATTERY FACILITY AND THE SURROUNDING GROUNDS.

THE BIOASSAY INVESTIGATION AND THE FS PLANNED FOR THE WEST FOUNDRY COVE, HUDSON RIVER IN THE VICINITY OF THE

COLD SPRING PIER, AND THE FORMER BATTERY FACILITY PORTION OF THE SITE IS SCHEDULED FOR COMPLETION IN APRIL 1987. SINCE DREDGING, SEDIMENT THICKENING, FIXATION, AND SANITARY LANDFILL DISPOSAL OF THE CADMIUM-CONTAMINATED SEDIMENTS IS A POSSIBLE REMEDIAL ALTERNATIVE FOR THIS PORTION OF THE SITE, COORDINATION OF REMEDIAL DESIGN AND REMEDIAL IMPLEMENTATION ACTIVITIES SHOULD BE PHASED IN SUCH A WAY TO ENSURE COST-EFFECTIVE MANAGEMENT OF CONSULTANT/CONTRACTOR RESOURCES, EQUIPMENT, AND SCHEDULES.

#TMA
TABLES, MEMORANDA, ATTACHMENTS

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#RS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SEPTEMBER 12, 1985
DEAR CONCERNED CITIZEN:

THE MARATHON BATTERY FEDERAL SUPERFUND REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) BEING CONDUCTED IN COLD SPRING, PUTNAM COUNTY HAS BEEN CONTINUING SINCE WE LAST CONTACTED YOU. THIS LETTER IS INTENDED TO BRING YOU UP TO DATE AND MAKE YOU AWARE OF SOME IMPORTANT UPCOMING EVENTS.

THE INVESTIGATION OF FOUNDRY COVE HAS BEEN COMPLETED AND THE DRAFT REMEDIAL INVESTIGATION REPORT IS AVAILABLE FOR YOUR REVIEW AT THE PROJECT'S DOCUMENT DEPOSITORIES LOCATED AT THE PHILIPSTOWN TOWN HALL, 234 MAIN STREET AND AT THE PROCO OFFICE, 194 MAIN STREET. THE DRAFT REMEDIAL INVESTIGATION REPORT REVIEWS THE SAMPLING AND ANALYSIS PROGRAM THAT WAS CARRIED OUT AND DESCRIBES THE NATURE AND EXTENT OF THE CONTAMINATION.

WE WILL BE HOLDING A PUBLIC MEETING TO PRESENT THE RESULTS OF THE INVESTIGATION, RECEIVE COMMENTS FROM THE PUBLIC AND EXPLAIN WHAT HAPPENS NEXT IN THE PROJECT.

PUBLIC MEETING
7:00 P.M.
SEPTEMBER 26, 1985
234 MAIN STREET, COLD SPRING

AS YOU ARE PROBABLY AWARE, IT WAS NECESSARY TO POSTPONE THE ON-SITE INVESTIGATION THAT WAS ORIGINALLY SCHEDULED FOR THE SPRING OF 1984. THIS ON-SITE WORK INCLUDED THE INSTALLATION OF FIVE WELLS AND THE COLLECTING OF SEVERAL SOIL SAMPLES. THE WELLS HAVE BEEN INSTALLED AND SOIL AND GROUND WATER SAMPLES HAVE BEEN TAKEN. WE EXPECT TO RECEIVE THE RESULTS FROM THIS WORK IN THE NEAR FUTURE.

WE HAVE ALSO BEEN WORKING ON THE DEVELOPMENT OF THE FEASIBILITY STUDY. IT WILL EVALUATE ALTERNATIVE METHODS OF DEALING WITH THE CONTAMINATION PROBLEM AND IDENTIFY A RECOMMENDED COURSE OF ACTION. DURING DEVELOPMENT OF THE FEASIBILITY STUDY TWO SIGNIFICANT PROBLEMS HAVE BEEN POINTED OUT WHICH MAKE IT DIFFICULT TO SELECT A SINGLE ALTERNATIVE FOR REMEDIATION OF THE CADMIUM (AND OTHER METALS) PROBLEM EXISTING IN THE COLD SPRING AREA; 1) DEGREE OF ADVERSE IMPACT OF REMEDIATION ON SURROUNDING WETLANDS AND 2) EFFICIENCY OF REMOVAL OF SEDIMENTS. IT IS PRESENTLY NOT POSSIBLE, WITHOUT A CLOSER LOOK AT SITE CONDITIONS AND PHYSICAL MAKEUP OF THE SEDIMENTS, TO DETERMINE WHAT PERCENTAGE OF THE CONTAMINATED MATERIAL CAN BE REMOVED USING DIFFERENT TECHNOLOGIES AVAILABLE (VARIOUS METHODS OF DREDGING, DRAGLINE, DRY EXCAVATION, ETC). IT IS PRESENTLY PROPOSED BY THE USEPA THAT WE RESERVE DECISION ON A PARTICULAR ALTERNATIVE UNTIL THE IMPACTS ON CONSTITUTION MARSH WETLANDS AND REMOVAL EFFICIENCIES CAN BE REVIEWED IN GREATER DEPTH. IT IS HOPED THAT BY THE DATE OF THE PUBLIC MEETING WE WILL BE ABLE TO INFORM YOU ABOUT HOW MUCH OF A PROJECT DELAY THESE ADDITIONAL STUDIES WILL CAUSE. WE WANTED TO MENTION THE ADDITIONAL WORK HERE SO THAT IT WILL NOT BE A SURPRISE, TAKING AWAY FROM THE MAIN PURPOSE OF THE MEETING WHICH IS TO DISCUSS THE FINDINGS OF OUR INVESTIGATION AND WHERE IT WILL LEAD US.

IF THERE ARE ANY QUESTIONS OR COMMENTS RELATED TO THE PROJECT PRIOR TO THE PUBLIC MEETING, TOM REYNOLDS OF MY STAFF CAN BE CONTACTED AT (518) 457-9538. YOU MAY ALSO CONTACT BRUCE BENTLEY WITH QUESTIONS/COMMENTS AT 1-800-342-9296. WE URGE YOU AND YOUR NEIGHBORS TO REVIEW THE DOCUMENTS AT THE DEPOSITORIES AND WE LOOK FORWARD TO YOUR ATTENDING THE MEETING, IT IS IMPORTANT THAT YOU TAKE AN ACTIVE ROLE AND PARTICIPATE IN THE PROJECT.
SINCERELY,
CHARLES N. GODDARD, P.E.
CHIEF
BUREAU OF HAZARDOUS SITE CONTROL
DIVISION OF SOLID AND HAZARDOUS WASTE
CC: G. PAVLOU, USEPA
J. SINGERMAN, USEPA
A. BITTNER - PUTNAM COUNTY HEALTH DEPARTMENT
B. QUINN - USEPA, WASHINGTON
S. CHRISTOFERSON - NATIONAL OCEANIC ATMOSPHERIC ADMINISTRATION.

1. WHAT IS THE WATER CLASSIFICATION FOR FOUNDRY COVE?

ANSWER: CLASS B WATERS. NEITHER TOTAL NOR SOLUBLE CONCENTRATIONS OF CADMIUM WERE ABOVE THE EXISTING STATE STANDARD OF 0.3 MG/L FOR THE PROTECTION OF FRESH WATER AQUATIC LIFE FOR THIS CLASS OF WATER.

2. WAS THERE ANY SAMPLING OF FETUSES?

ANSWER: THE ONLY NEWBORN BIOTA SAMPLES AVAILABLE DURING THE STUDY WERE BIRD AND REPTILE EGGS FROM EAST FOUNDRY COVE AND CONSTITUTION MARSH. WITHOUT COMPARISON DATA FROM THE CONTROL SITE, TIVOLI BAY, THE RESULTS FROM THIS SAMPLING WAS NOT INCORPORATED INTO THE INVESTIGATION REPORT. THE RESULTS FROM THIS PORTION OF THE STUDY CAN BE FOUND IN APPENDIX D & E.

3. HAS THERE BEEN ANY SOIL SAMPLING PERFORMED ON PROPERTIES ADJOINING THE MERCHANDISE DYNAMICS PROPERTY?

ANSWER: WE PERFORMED A PHASE II FIELD INVESTIGATION UNDER THE NEW YORK STATE SUPERFUND PROGRAM. THIS WORK INCLUDED; INSTALLATION OF FIVE (5) GROUNDWATER MONITORING WELLS, TWENTY-FIVE (25) SURFACE SOIL SAMPLES, AND "DUST" FROM INSIDE THE FORMER BATTERY PLANT. WE HAVE RECEIVED THE RESULTS FROM THIS WORK AND ALTHOUGH THERE DOES NOT APPEAR TO BE A PROBLEM WITH CADMIUM CONTAMINATION IN THE GROUNDWATER BELOW THE SITE, CONCENTRATIONS ARE QUITE HIGH IN SURFICIAL SOILS AND DUST WITHIN THE PLANT. A PHASE II REPORT SHOULD BE AVAILABLE WHICH WILL PRESENT AND DISCUSS ALL THE RESULTS FROM THIS PORTION OF THE OVERALL INVESTIGATION. AS PART OF ADDITIONAL SAMPLING, WE HAVE PLANNED AS A MINIMUM THE ON-SITE DRUMS AND SEVERAL SOIL SAMPLES FROM BEYOND THE MERCHANDISE DYNAMICS PROPERTY.

4. THERE HAS BEEN AN ABOVE AVERAGE NUMBER OF CANCERS IN THE COMMUNITY SURROUNDING THE FORMER BATTERY PLANT, HAS THIS BEEN LOOKED INTO?

ANSWER: WE HAD THIS SAME QUESTION AT A PUBLIC MEETING WE HELD IN FEBRUARY, 1984. AT THAT TIME, IT WAS EXPLAINED THAT THE PURPOSE OF OUR STUDY WAS TO PHYSICALLY DEFINE THE EXTENT OF THE CONTAMINATION AND ITS IMPACT ON THE ENVIRONMENT FOR THE PURPOSE OF SELECTING AND DESIGNING A REMEDIAL ALTERNATIVE. THE WORK REQUESTED IN THE ABOVE QUESTION WAS HEALTH DEPARTMENT ORIENTED. CONSEQUENTLY, WE MADE AN INQUIRY TO DETERMINE HOW IT COULD BE ACCOMPLISHED. IT WAS DETERMINED THAT THE CONCERNED RESIDENT WOULD HAVE TO DIRECT A REQUEST TO THE COUNTY HEALTH DEPARTMENT WHICH WOULD THEN REQUEST ASSISTANCE FROM THE STATE HEALTH DEPARTMENT FOR EVALUATION/CONSIDERATION. THIS INFORMATION WAS PASSED ALONG TO THE CONCERNED RESIDENT WHO DESPITE A FOLLOW-UP CALL FROM US, FAILED TO EVER SUBMIT A REQUEST. IF THERE IS STILL AN INTEREST IN HAVING AN EPIDEMIOLOGICAL STUDY RELATED TO CADMIUM PERFORMED, IT IS NOT TOO LATE TO MAKE SUCH A REQUEST TO THE PUTNAM COUNTY HEALTH DEPARTMENT.

5. HOW CAN THE SIGNIFICANT BIOACCUMULATION OF HEAVY METALS OBSERVED IN THE LIVE CAR TESTS BE EXPLAINED SINCE THE TEST ORGANISMS WERE NOT ALLOWED TO BE IN CONTACT WITH CONTAMINATED SEDIMENT?

ANSWER: THE FACT THAT THE TEST ORGANISMS WERE MAINTAINED FREE OF CONTACT WITH CONTAMINATED SEDIMENTS IS A SIGNIFICANT POINT. SURFACE WATER SAMPLING PERFORMED AT THE SAME TIME FAILED TO SHOW A RELATIVE SERIOUS CONTAMINATION PROBLEM, YET THE BIOACCUMULATION TESTS CLEARLY SHOW THERE ARE BIO-AVAILABLE METALS. WHAT WE ARE OBSERVING IN THESE TESTS IS HOW REMARKABLY EFFICIENT THE TEST ORGANISMS WERE IN FILTERING AND ASSIMILATING LOW LEVELS OF METALS FROM THEIR ENVIRONMENTS INTO THEIR BODIES. IT MUST BE KEPT IN MIND THAT THE LIVE CAR TESTS WERE NOT PERFORMED IN THE MORE HIGHLY CONTAMINATED AREAS DUE TO INADEQUATE WATER AT LOW TIDE TO MAINTAIN THE ORGANISMS AT THESE LOCATIONS.

6. THE REPORT REPRESENTS A SCIENTIFIC DOCUMENT AND IN THE ABSENCE OF STANDARDS FOR CONTAMINANT CONCENTRATIONS IN VARIOUS TYPES OF MEDIA (SEDIMENTS AND BIOTA), THE AUTHORS SHOULD REMOVE THE TERM "EXCESSIVE" WHEN DISCUSSING COMPARISON RESULTS. WITHOUT STANDARDS, HOW DOES THE AUTHOR KNOW WHAT IS OR IS NOT "EXCESSIVE".

ANSWER: IT IS TRUE THAT THERE ARE NOT INPLACE STANDARDS FOR CONCENTRATIONS OF CADMIUM, NICKEL OR COBALT (THE THREE HEAVY METALS OF CONCERN) IN THE VARIOUS BIOTA TESTED IN OUR STUDY. THE AUTHORS' USE OF THE TERM "EXCESSIVE" IS BASED UPON HIS COMPARISON OF SAMPLING RESULTS FROM THE STUDY AREA, MORE SPECIFICALLY EAST FOUNDRY COVE, AND THE CONTROL SITE, TIVOLI BAY. I CAN UNDERSTAND THE OBJECTION OF THE USE OF A TERM LIKE "EXCESSIVE" IN A SCIENTIFIC DOCUMENT BUT I AM STILL WILLING TO GIVE THE AUTHOR LATITUDE WHEN I SEE A

COMPARISON OF RESULTS SUCH AS WITH BENTHIC ALGAE WHICH HAD A BACKGROUND AVERAGE OF 2.0 UG/G WET WEIGHT AT TIVOLI BAY AND AN AVERAGE OF 506 UG/G WET WEIGHT (A MAXIMUM OF 2,840 UG/G WET WEIGHT) AT EAST FOUNDRY COVE.

7. WAS THERE A FINAL CONSENT JUDGEMENT IN 1972 WHICH ACTUALLY RELEASES BOTH GOULD AND MARATHON FROM FUTURE LIABILITY?

ANSWER: ONLY AN INDEPTH LEGAL EVALUATION OF THE LEGAL DECISIONS/DOCUMENTS RESULTING FROM THE 1970-1973 ACTION BROUGHT BY THE U.S. ATTORNEY'S OFFICE COULD BEGIN TO ANSWER THE ABOVE QUESTION CONCERNING SITE RESPONSIBILITY/LIABILITY. THERE WAS A SATISFACTION JUDGEMENT GIVEN IN 1973 WHICH, IN EFFECT, GAVE RELEASE OF PARTICULAR PAST OWNERS/OPERATORS, INCLUDING MARATHON BATTERY, OF FUTURE LIABILITY GREATER THAN $100,000 TOWARDS REMEDIATION. WHETHER THIS SETTLEMENT MADE BY THE U.S. ATTORNEY'S OFFICE IS STILL BINDING WITH CERCLA (FEDERAL SUPERFUND) IN EXISTENCE AND/OR INTERPRETED NEW EVIDENCE, IS SOMETHING WHICH REQUIRES LEGAL REVIEW.

8. A RECENT NEWSPAPER ARTICLE RELATED TO SEDIMENT SAMPLING RESULTS FROM THE COLD SPRING PIER AREA CONTAINS A REFERENCE TO A STATEMENT BY MR. THOMAS REYNOLDS OF NYSDEC THAT HE FELT THE RESULTS WERE "SCARY". THIS STATEMENT SCARES THE PEOPLE READING THE ARTICLE AND IT IS FELT AN EXPLANATION OR PERHAPS A RETRACTION IS IN ORDER.

ANSWER: WELL I'M THOMAS REYNOLDS SO I GUESS I'M THE FELLOW WHO MADE THE STATEMENT. I CAN'T SAY I EXACTLY REMEMBER EXPRESSING THE TERM BUT IN NO WAY DENY HAVING DONE SO. IT MUST BE KEPT IN MIND THAT AS PART OF MANAGING A PROJECT LIKE THE MARATHON BATTERY RI/FS THE PERSON RESPONSIBLE MUST REVIEW A LARGE VOLUME OF INVESTIGATION RESULTS. AS A CONSEQUENCE OF THIS REVIEW THE PROJECT MANAGER SOON DEVELOPS A FEELING FOR WHAT DOES AND DOES NOT REPRESENT SIGNIFICANT LEVELS OF CONTAMINATION. IN REGARDS TO THE COLD SPRING PIER AREA, THE SEDIMENT SAMPLING RESULTS CAME BACK WITH VALUES RANGING FROM BACKGROUND (1 TO 3 PPM) TO AS GREAT AS 2200 PPM CADMIUM (ON THE SURFACE OF BOTTOM SEDIMENT). WHEN CONSIDERING THAT THESE SAMPLES REPRESENT CONTAMINATION FROM A DIRECT RELEASE OF WASTES INTO THE HUDSON RIVER AT LEAST SIX (6) OR SEVEN (7) YEARS AGO, IT IS REASON FOR "CONCERN" IN REGARDS TO POTENTIAL ENVIRONMENTAL IMPACT ON A VERY LARGE ECOSYSTEM AND THE TECHNICAL PROBLEMS INVOLVED WITH DEFINING ITS EXTENT. THE USE OF THE WORD "SCARY" WAS A POOR CHOICE OF WORDS SINCE IT SHOULD HAVE BEEN ANTICIPATED IT WOULD BE INTERPRETED FROM A HEALTH STAND POINT AND NOT THE TECHNICAL POINT OF VIEW FROM WHICH IT WAS MADE.

9. AREN'T THERE OTHER SOURCES OF CADMIUM ALONG THE HUDSON RIVER?

ANSWER: THERE ARE SEVERAL PAPERS/STUDIES WHICH MAKE REFERENCE TO OTHER SOURCES OF CADMIUM IMPACTING THE HUDSON RIVER (E.G. KAIA, E.J. 1981. "CADMIUM CONTAMINATION AND POTENTIAL SOURCES IN THE HUDSON AND MOHAWK RIVERS.". TOXIC SUBSTANCE CONTROL UNIT. UNPUBLISHED MANUSCRIPT). IN THESE PAPERS, THE BASIS FOR CLAIMS OF OTHER SOURCES ARE OFTEN EVIDENCE OF THEIR IMPACTS RATHER THAN ACTUAL SAMPLING OF SEDIMENT AND/OR SURFACE WATER. HOPEFULLY, FOLLOWING OR CONGRUENTLY WITH THE MARATHON BATTERY STUDY (FOUNDRY COVE/CONSTITUTION MARSH) A MORE INDEPTH LOOK AT CADMIUM IN THE HUDSON RIVER CAN BE PERFORMED.

10. CONCERNING A COMPARISON OF A HUDSON RIVER BACKGROUND LEVEL FOR CADMIUM AS OPPOSED TO WHAT WAS FOUND IN THE STUDY, HOW THIS MIGHT RELATE TO CONTAMINANT FLUX.

ANSWER: BASED ON PREVIOUS STUDIES AND PUBLISHED REFERENCE MATERIALS RELATED TO MARINE SEDIMENTS BACKGROUND WAS TAKEN TO BE APPROXIMATELY 2.5 PPM CADMIUM. DEPENDING ON THE DEPTH OF SEDIMENT SAMPLE AND ORGANIC CONTENT, WE FOUND CADMIUM CONCENTRATIONS TO RANGE FROM LESS THAN 1 PPM TO 3.6 PPM CD IN OUR CONTROL AREA, TIVOLI BAY. IN REGARDS TO CONTAMINANT FLUX (INTERPRETED TO MEAN "MIGRATION"), IN EAST FOUNDRY COVE WE HAVE CONCENTRATIONS RANGING FROM THE BACKGROUND LEVEL TO 171,000 PPM CD. COMPARING CADMIUM LEVELS DETERMINED IN OUR PRESENT STUDY WITH THOSE FROM EARLIER INVESTIGATIONS (1970'S), AT SIMILAR LOCATION IN FOUNDRY COVE, WE FIND INCREASED LEVELS OF HEAVY METALS AT GREATER DISTANCES FROM THE POINT OF RELEASE. MEASUREMENTS OF COVE AND RIVER FLOW PATTERNS IN RELATION TO DISSOLVED AND INSOLUBLE METALS DOES NOT INDICATE THAT THE CONTAMINATED AREA WILL CLEANSE ITSELF IN AN IDENTIFIABLE PERIOD OF TIME. WE ARE ONLY OBSERVING AN INCREASE IN AREAS COMPROMISED BY CONTAMINATION, NOT A CLEANING UP OF THE ENVIRONMENT AS TIME PASSES.

11. THE AVERAGE HOME CONTAINS BETWEEN 100-1500 MILLIGRAMS OF CADMIUM. PEOPLE ARE EXPOSED TO CADMIUM EVERY TIME THEY TURN ON A LIGHT SWITCH.

RESPONSE: AS PART OF EACH OF OUR LIVES, IN OR OUTSIDE OF OUR HOMES, WE ARE CONFRONTED AND EXPOSED TO VARIOUS COMPOUNDS WHICH DEPENDING ON THE LEVEL OR DURATION OF EXPOSURE, REPRESENT HAZARDS TO OUR WELL BEING. IT WOULD BE DIFFICULT, IF NOT IMPOSSIBLE, TO REMOVE ALL HAZARDOUS MATERIALS FROM OUR LIVES BUT IT IS OFTEN POSSIBLE FOR US TO REDUCE OUR AMOUNT OF EXPOSURE TO THEM. REDUCING EXPOSURE TO CONTAMINANTS IN THE ENVIRONMENT IS PERHAPS EVEN MORE IMPORTANT SINCE MOST IMPACTED ORGANISMS CANNOT VOLUNTARILY AVOID CONTACT. WE SHARE THE ENVIRONMENT WE LIVE IN AND MUST TAKE THE RESPONSIBILITY FOR ASSURING THAT IT IS A SAFE AND HEALTHY PLACE TO LIVE WHETHER CONSIDERING HUMAN OR OTHER LIFE FORMS.

12. IF THE HIGHER CONTAMINATED AREAS ARE CONTAINED, WILL THE COVE/MARSH CLEAN ITSELF? CAN THIS ACTION BE TAKEN SOONER THAN THE TOTAL REMEDIATION?

RESPONSE: ONE OF THE REMEDIAL ALTERNATIVES BEING CONSIDERED IS TO CONTAIN THOSE AREAS WHICH ARE SO HIGHLY CONTAMINATED. IT MAY BE UNFEASIBLE TO ADEQUATELY REMOVE SUCH CONCENTRATIONS. AS PART OF THIS ALTERNATIVE IT IS PROPOSED AREAS WHICH EXHIBIT A LESSER DEGREE OF CONTAMINATION BUT ABOVE AN ESTABLISHED "RESPONSE LEVEL" (NOT YET IDENTIFIED) WILL BE REMOVED AND PLACED WITHIN THE CONTAINED AREA. OUR STUDY HAS SHOWN THAT LOWER CONCENTRATIONS OF HEAVY METALS ALSO PRESENT A PROBLEM AND REQUIRE CONSIDERATION TO EFFECT A SATISFACTORY CLEAN-UP OF THE FOUNDRY COVE/CONSTITUTION MARSH PROBLEM. THE RESULTS FROM THE LIVE CAR BIOACCUMULATION TESTING IS THE BASIS FOR THIS CONSIDERATION. IT WAS NOT NECESSARY FOR US TO CONDUCT THE LIVE CAR WORK IN THE WORST AREAS TO ACQUIRE SIGNIFICANT RESULTS. ONE OF THE LIVE CARS WAS LOCATED IN AN AREA WHERE SEDIMENT CONCENTRATIONS WERE APPROXIMATELY 200 PPM AND YET RAPID BIOACCUMULATION OF HEAVY METALS WAS EVIDENCED.

13. IS THE KEMBLE AVE STORM SEWER STILL BEING USED? COULD IT STILL HAVE CONTAMINATED SEDIMENT IN IT?

RESPONSE: AS PART OF OUR INVESTIGATION, WE SAMPLED THIS SEWER LINE BUT NO SEDIMENTS WERE PRESENT TO COLLECT FOR ANALYSIS. AS PART OF THE 1972-1973 CLEAN-UP PERFORMED BY MARATHON AND GOULD, THE STORM SEWER WAS FLUSHED OF CONTAMINATED MATERIALS. IT DOES NOT APPEAR THE SEWER REPRESENTS A CONTINUED OR FUTURE SOURCE OF HEAVY METALS CONTAMINATION.

14. SO FAR EVERYTHING STATED ABOUT CADMIUM IS DIFFICULT TO DIRECTLY CORRELATE WITH HUMAN HEALTH EFFECTS, HOWEVER, A FEW YEARS AGO A MEDICAL JOURNAL REPORTED HEALTH RELATED EFFECTS RELATED TO A SUBSTITUTION OF CADMIUM IN SOLDER BECAUSE OF A TIN SHORTAGE. THIS ARTICLE REPORTED THAT THERE WAS A NOTICEABLE INCREASE IN THE NUMBER OF HEART RELATED FATALITIES CONNECTED WITH THE USE OF THE CADMIUM/LEAD SOLDER.

RESPONSE: THIS IS INTERESTING AND ADDS TO OUR CONCERN FOR EXPOSURE TO CADMIUM.

15. HOW MUCH TIME DO YOU EXPECT IT WILL NOW TAKE TO GET TO THE STAGE WHERE THE RECORD OF DECISION (ROD) CAN BE PERFORMED?

RESPONSE: THE ACTUAL TIME IT WILL TAKE TO COMPLETE THE REMAINDER OF THE WORK NECESSARY TO PERFORM THE ROD DEPENDS ON WRITING THE SCOPE OF WORK FOR ADDITIONAL WORK, APPROVAL OF NEW WORK BY USEPA, APPROPRIATION OF REQUIRED MONEY, CONTRACTING WITH THE CONSULTANT, ETC. IT IS HOPED THIS CAN ALL BE ACCOMPLISHED WITH WORK COMPLETED IN THE NEXT EIGHT (8) MONTHS.

16. WHEN WILL THE ADDITIONAL WORK BEGIN?

RESPONSE: AS SOON AS A WORK PLAN IS APPROVED AND A CONTRACT HAS BEEN SIGNED BY BOTH NYSDEC AND THE SELECTED CONSULTING ENGINEER.

17. IS THE HUDSON RIVER PORTION OF THE PROJECT PRESENTLY FUNDED? WHAT IS ALREADY FUNDED OR WILL BE FUNDED?

RESPONSE: AS A RESULT OF THE COMPLETED REMEDIAL INVESTIGATION, THE HEAVY METAL IMPACTED AREAS HAVE BEEN RECOGNIZED AS TWO SEPARATE AND DISTINCTIVE ENVIRONMENTS; THE HUDSON RIVER AND FOUNDRY COVE/CONSTITUTION MARSH. WE ARE PRESENTLY PROCEEDING WITH THE USEPA'S SUPPORT FOR ACTIVITIES RELATED TO THE FOUNDRY COVE/CONSTITUTION MARSH AREAS. THE DIVIDING BOUNDARY IS THE METRO-NORTH RAILROAD BED. THE HUDSON RIVER IS RECOGNIZED AS BEING IMPACTED AND POTENTIALLY A SIGNIFICANT PROBLEM BUT IT IS PRESENTLY UNDECIDED WHAT WOULD BE THE BEST APPROACH TO ITS STUDY. WE DID NOT WANT TO SEE A DELAY IN DECIDING ON A REMEDIAL ALTERNATIVE FOR THE OTHER AREAS SO THE HUDSON RIVER PORTION HAS BEEN SEPARATED FOR FUTURE CONSIDERATION.

18. WILL THE PUBLIC HAVE AN OPPORTUNITY TO REVIEW THE FEASIBILITY STUDY (FS) REPORT FOLLOWING COMPLETION OF THE ADDITIONAL WORK?

RESPONSE: PRIOR TO PERFORMANCE OF THE ROD IT IS A REQUIREMENT OF FEDERAL LAW THAT RI/FS REPORTS ARE AVAILABLE TO THE PUBLIC FOR A THREE WEEK REVIEW PERIOD DURING WHICH THEY ARE AFFORDED THE OPPORTUNITY TO MAKE COMMENTS. WE ARE ALSO REQUIRED TO ADDRESS EACH COMMENT RECEIVED FROM THE PUBLIC, NOT NECESSARILY EFFECTING A CHANGE IN DOCUMENTS OR STATE OR FEDERAL AGENCY DECISIONS, BUT TO PROVIDE AN ADEQUATE RESPONSE.

19. HAS THE HEALTH DEPARTMENT SEEN THE REPORTS/FIGURES AND HAS THERE BEEN A REVISION OF THE ADVISORY?

RESPONSE: YES, COPIES OF THE REPORTS WITH TABLES AND FIGURES HAVE BEEN FORWARDED TO BOTH THE STATE AND COUNTY HEALTH DEPARTMENT OFFICES. THERE HAS NOT BEEN ANY SUGGESTED CHANGES TO THE EXISTING HEALTH ADVISORY CONCERNING THE CONSUMPTION OF SELECTED ORGANISMS FROM IN AND AROUND THE HUDSON RIVER.

EPA NEWS RELEASE

86(63) HERMAN PHILLIPS (212)264-2515

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EPA SETS PUBLIC MEETING ON MARATHON BATTERY SITE IN COLD SPRING, NY

NEW YORK -- THE U. S. ENVIRONMENTAL PROTECTION AGENCY (EPA) WILL HOLD A PUBLIC MEETING TO DISCUSS THE RESULTS OF THE SUPPLEMENTAL REMEDIAL INVESTIGATION AND FEASIBILITY STUDY CONDUCTED FOR THE MARATHON BATTERY HAZARDOUS WASTE SITE IN COLD SPRING, NEW YORK AT 7:30 P.M., AUGUST 26, 1986, IN THE PHILIPSTOWN TOWN HALL, IN COLD SPRING.

THE SUPPLEMENTAL INVESTIGATION AND STUDY DOCUMENTS ARE LOCATED FOR PUBLIC REVIEW AT TWO REPOSITORIES IN COLD SPRING -- THE PHILIPSTOWN TOWN HALL, 238 MAIN STREET, AND PROCO AT 73A MAIN STREET.

EPA WILL CONTINUE TO ACCEPT PUBLIC COMMENTS UNTIL SEPTEMBER 15, 1986.

BACKGROUND

THE MARATHON BATTERY SITE INCLUDES A FORMER NICKEL-CADMIUM BATTERY MANUFACTURING FACILITY, THE HUDSON RIVER IN THE VICINITY OF THE COLD SPRING PIER, AND A SERIES OF RIVER BACKWATER AREAS KNOWN AS EAST FOUNDRY COVE, CONSTITUTION MARSH, AND WEST FOUNDRY COVE.

WHILE THE BATTERY FACILITY WAS IN OPERATION FROM 1953 TO 1979, PROCESS WASTES WERE DISCHARGED INTO THE HUDSON RIVER AT THE COLD SPRING PIER AND INTO FOUNDRY COVE. IN THE EARLY 1970'S, PORTIONS OF FOUNDRY COVE WERE DREDGED AND THE DREDGE SPOILS WERE ENTOMBED IN A LINED VAULT ON THE BATTERY PLANT GROUNDS. POST-DREDGING MONITORING, HOWEVER, CONTINUED TO DETECT ELEVATED LEVELS OF CADMIUM AND NICKEL IN THE COVE.

THE STATE OF NEW YORK'S CONTRACTOR, ACRES INTERNATIONAL, PERFORMED EXTENSIVE SAMPLING AND REMEDIAL ALTERNATIVE ANALYSIS AT THE SITE FROM 1984-1985.

DURING THE WEEK OF MAY 26, 1986, EPA'S CONTRACTOR, EBASCO SERVICES, INC., BEGAN FIELD ACTIVITIES COLLECTING ADDITIONAL SAMPLES IN THE HIGHLY CONTAMINATED EAST FOUNDRY COVE AND IN CONSTITUTION MARSH IN ORDER TO SATISFY ADDITIONAL DATA NEEDS TO AID EPA IN SELECTING A REMEDIAL MEASURE FOR EAST FOUNDRY COVE AND CONSTITUTION MARSH. THE ACTIVITIES WERE PART OF THE PHASE I SUPPLEMENTAL REMEDIAL INVESTIGATION AND FEASIBILITY STUDY.

A LATER PHASE, BEGINNING THIS FALL, WILL ADDRESS LONG-TERM PROBLEMS POSED BY THE REST OF THE SITE, INCLUDING WEST FOUNDRY COVE, THE HUDSON RIVER IN THE VICINITY OF THE COLD SPRING PIER AND THE FORMER BATTERY PLANT. EPA IS CONDUCTING THE WORK UNDER THE FEDERAL SUPERFUND FOR REMEDIATION OF HAZARDOUS WASTE SITES.

MARATHON BATTERY SITE
COLD SPRING, NEW YORK

SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND THE EPA RESPONSES TO THE CONTRACT.

THE PUBLIC MEETING FOR THE MARATHON BATTERY SITE WAS HELD ON AUGUST 26TH, 1986 AT 7:30 P.M. AT THE PHILLIPSBURG TOWN HALL, COLD SPRING, NEW YORK. THE MEETING, WHICH INCLUDED APPROXIMATELY 60 INTERESTED CITIZENS, FOUR EPA OFFICIALS, AND SEVEN OF EPA'S CONTRACTORS, HAD TWO OBJECTIVES. THE FIRST AND PRIMARY OBJECTIVE WAS THE PRESENTATION AND DISCUSSION OF THE SUPPLEMENTAL RI/FS FOR THE MARATHON BATTERY SITE COMPLETED BY EPA'S CONSULTANT EBASCO SERVICES, INCORPORATED IN AUGUST, 1986. THE SECOND OBJECTIVE WAS FOR EPA TO UPDATE INTERESTED CITIZENS ON OTHER WORK BEING CONDUCTED AT THE MARATHON BATTERY SITE. LILLIAN JOHNSON, COMMUNITY RELATIONS COORDINATOR FOR EPA REGION II, OPENED THE MEETING WITH A BRIEF EXPLANATION OF THE SUPERFUND PROGRAM, THE PURPOSE OF THE MEETING, AND AN INTRODUCTION OF THE EPA PROJECT MANAGER, JOEL SINGERMAN. MR. SINGERMAN THEN EXPLAINED THAT APPROXIMATELY A YEAR AGO, EPA WAS HERE WITH NYSDEC AND THEIR CONSULTANT ACRES INTERNATIONAL AND PRESENTED THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY FOR THE MARATHON BATTERY SITE. THE RESULT OF THIS RI/FS INDICATED WIDESPREAD CONTAMINATION OF THE SITE WITH CADMIUM, COBALT, AND NICKEL. HOWEVER, BASED UPON THE RESULTS OF THIS STUDY AND EPA'S ANALYSIS, EPA DETERMINED THAT THERE WAS INADEQUATE INFORMATION IN THIS RI TO EFFECTIVELY EVALUATE THE TECHNICAL MERITS OF THE REMEDIAL ALTERNATIVES RECOMMENDED FOR THIS SITE.

AS A RESULT IN OCTOBER OF 1985, EPA ASKED THE U.S. ARMY CORPORATION OF ENGINEERS TO DO A TECHNICAL EVALUATION OF THE FEASIBILITY OF DREDGING. THIS INVESTIGATION WAS COMPLETED IN FEBRUARY 1986.

IN MARCH 1986, THE NYSDEC ASKED EPA TO ASSUME THE LEAD RESPONSIBILITY FOR THIS PROJECT. EPA THEN REQUESTED EBASCO SERVICES TO DO A SUPPLEMENTAL RI/FS. THE OBJECTIVE TO THIS SUPPLEMENTAL REMEDIAL INVESTIGATION INCLUDED:

- TO DEFINE LATERAL AND VERTICAL EXTENT OF CD, CO, NI CONTAMINATION IN EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH SEDIMENTS.

- TO EVALUATE REMEDIAL FEASIBILITY OF TREATING CONTAMINATED SEDIMENTS AND THE POTENTIAL IMPACTS OF PROPOSED REMEDIAL MEASURES WITH BENCH SCALE TESTS.

- TO IDENTIFY CONTAMINANTS AND PATHWAYS THAT HAVE ACTUAL OR POTENTIAL IMPACT ON PUBLIC HEALTH OR THE ENVIRONMENT.

EBASCO UNDERTOOK THIS SUPPLEMENTAL RI/FS IN MARCH, 1986 AND SUBMITTED IT IN AUGUST, 1986. MR. SINGERMAN THEN EXPLAINED THAT IN AN EFFORT TO EXPEDITE THE CLEANUP OF THE MARATHON BATTERY SITE THE EPA HAD DIVIDED THE SITE INTO TWO SEPARATE AREAS FOR STUDY AND CLEANUP PURPOSES. THE FIRST AREA IS COMPRISED OF EAST FOUNDRY COVE, FOUNDRY COVE MARSH AND CONSTITUTION MARSH. THIS IS THE AREA INCLUDED WITHIN THE SUPPLEMENTAL RI/FS THAT WAS RELEASED BY EPA ON AUGUST 15, 1986. MR. SINGERMAN THEN EXPLAINED THAT AFTER A BRIEF UPDATE ON THE STATUS OF THE INVESTIGATION FOR AREA II OF THE MARATHON BATTERY SITE, WHICH IS COMPRISED OF WEST FOUNDRY COVE, THE MARATHON BATTERY PLANT AND THE AREA AROUND COLD SPRING PIER THAT HE WOULD TURN THE PRESENTATION OVER TO EBASCO SERVICES. IN ADDITION, MR. SINGERMAN THEN STATED THAT EPA HAS REQUESTED OSHA TO INVESTIGATE POTENTIAL HEALTH RISKS TO THOSE EMPLOYEES WORKING AT THE MARATHON BATTERY SITE. THESE INVESTIGATIONS ARE UNDERWAY AT THIS TIME AND MAY REQUIRE ADDITIONAL TESTING. TEST RESULTS WILL BE MADE AVAILABLE TO THE PUBLIC AT THE CONCLUSION OF THE INVESTIGATION.

IN MARCH, 1986, NYSDEC REQUESTED THAT EPA CONSIDER A REMOVAL ACTION AT THE MARATHON BATTERY PLANT. A REMOVAL ACTION IS AN ACTION TO PROVIDE REMOVAL OF A HAZARDOUS WASTE WHEN THERE IS IMMINENT RISK TO HEALTH OR SAFETY OF RESIDENTS. BECAUSE EPA DOES NOT HAVE JURISDICTION OF THOSE WORKERS AT THE MARATHON BATTERY PLANT, EPA REQUESTED OSHA TO INVESTIGATE. OSHA IS CURRENTLY CONDUCTING THAT INVESTIGATION. IN ADDITION, EPA IS CURRENTLY DOING ADDITIONAL SOIL TESTING IN THE AREA. MR. SINGERMAN THEN EXPLAINED THAT EPA'S TECHNICAL ASSISTANCE TEAM WOULD BE CONDUCTING SOIL SAMPLES IN THE YARDS ALONG CONSTITUTION DRIVE WITHIN THE NEXT MONTH.

MR. SINGERMAN WENT ON TO EXPLAIN THAT A SUPPLEMENTAL RI/FS FOR AREA II WAS NOW UNDERWAY BY EPA AND ITS

CONSULTANT EBASCO SERVICES, INCORPORATED.

THIS SUPPLEMENTAL RI/FS IS SCHEDULED FOR COMPLETION IN THE SPRING OF 1987. AFTER THAT, EPA AND ITS CONSULTANT, EBASCO SERVICES, INCORPORATED, PRESENTED THE RI/FS FOR AREA I AND WERE AVAILABLE FOR QUESTIONS AND COMMENT ON THE SUPPLEMENTAL RI/FS FOR AREA I OF THE MARATHON BATTERY SITE.

TECHNICAL QUESTIONS AND CONCERNS

ISSUE: THE 900 PPM LEVEL OF CONTAMINATION IS FOR BOTH HUMAN AND ANIMALS. THESE FIGURES ARE DERIVED FROM A HEALTH RISK ASSESSMENT MODEL THAT CONSIDERS THE NORMAL CONSUMPTION PATTERN OF THE BIOTA, IN PARTICULAR THE BLUE CRAB, OF CONTAMINATED SEDIMENT AND IN TURN NORMAL HUMAN CONSUMPTION OF THE CRAB OR DIRECT CONTACT AND EXPOSURE OF HUMANS TO CONTAMINATED SEDIMENT.

ISSUE: WHAT WOULD HAPPEN IF YOU TAKE ANIMAL LIFE INDIGENOUS TO THIS TYPE OF ECOSYSTEM FROM ANOTHER MARSH AREA WITHIN THE HUDSON AND TRANSPLANTED THEM TO ECM WITH 900 PPM OF CD CONTAMINANTS. I KNOW THAT LIFE (ANIMAL LIFE) TAKEN FROM OTHER PARTS OF THE HUDSON AND PLACED AT EFC HAVE DIED WITHIN 24 HOURS. WHAT DOES 900 PPM CD DO TO HEALTHY CREATURES?

RESPONSE: IN ACTUALITY WE ARE INTENDING TO CLEAN EC AND ECM TO 100 PPM CD OF CONTAMINANTS, WHICH WAS DETERMINED BY A HEALTH RISK ASSESSMENT MODEL THAT EXAMINES THE NORMAL INTAKE OF SEDIMENT OF BIOTA, I.E., THE CRAB AND IN TURN BY HUMANS. IN ADDITION, THE NORMAL EXPOSURE RISK OF HUMANS TO CONTAMINATED SEDIMENT WERE EXAMINED. THESE MODELS INDICATE THAT THERE IS NO RISK TO PUBLIC HEALTH FOR EXPOSURE TO CD UNDER A LEVEL OF 900 PPM.

ISSUE: WOULD YOU EAT CRABS FROM THE SITE IF IT WAS CLEANED TO 100 PPM?

RESPONSE: AS I STATED BEFORE, DATA TO DATE INDICATES THAT EXPOSURE TO CD AT LEVELS BELOW 900 PPM DOES NOT POSE A SIGNIFICANT HEALTH THREAT.

ECM IS THE MOST HEAVILY CONTAMINATED AREA WHICH WILL BE CLEANED UP TO 100 PPM AND THERE WILL BE A REVEGETATION COMPONENT TO THIS PLAN. SO THAT MEANS THIS AREA WILL BE CLEAN. EAST COVE WILL ALSO BE DREDGED TO A LEVEL OF 100 PPM.

AT CONSTITUTION MARSH, WHICH IS MANAGED BY THE NATIONAL AUDUBON SOCIETY, IT IS CONSIDERED THAT THE MOST BENIGN THING TO DO BECAUSE OF THE FRAGILE ECOSYSTEM IS TO IMPLEMENT ALTERNATIVE 1, THE NO ACTION ALTERNATIVE. THIS ALTERNATIVE WOULD INCLUDE 30 YEARS OF MONITORING THE NATURAL RESEDIMENTATION OF THE MARSH AT CONSTITUTION MARSH, AT THE NORTHERN END, THERE ARE THREE AREAS WITH CONTAMINATION RATES GREATLY EXCEED 100 PPM. HOWEVER, IT IS HOPED THAT BY THE CLEANUP OF THE EC AND ECM TO 100 PPM AND THE NATURAL RESEDIMENTATION THAT WILL OCCUR AT CONSTITUTION MARSH, THE LEVEL OF CONTAMINATION WILL CONTINUE TO DECREASE OVER TIME AT CONSTITUTION MARSH.

OUR THOUGHT IS THAT GIVEN WHAT WE KNOW, WHICH IS THAT THE SOURCE OF CONTAMINATION FOR CONSTITUTION MARSH IS THE OUTFALL AT KEMBLE AVENUE IN EAST FOUNDRY COVE, AND BY THE CLEANUP OF EC AND ECM THAT THE SOURCE OF CONTAMINATION WILL BE DECREASED IF NOT ELIMINATED AT CONSTITUTION MARSH. OUR THOUGHT IS THAT IN TIME THAT THIS CLEANUP, ALONG WITH THE NATURAL RESEDIMENTATION OF CONSTITUTION MARSH, THAT A, CONTAMINATED AREAS WILL BE COVERED AND B, SOME OF THE CONTAMINANTS WILL BE DISPERSED.

BACK TO THE ORIGINAL QUESTION, WE DO NOT HAVE A SAFE NUMBER FROM AN ECOLOGICAL PERSPECTIVE. IT'S OBVIOUS THAT BACKGROUND LEVELS CAN BE TOLERATED. THE BACKGROUND LEVELS FOR CD IN THE HUDSON RIVER RANGES ABOUT 10 PPM. IT IS KNOWN THAT CD BIO-ACCUMULATES. SOME LITERATURE HAS SHOWN THAT SOME SPECIES, PARTICULARLY PLANT SPECIES SUCH AS THE CAT-TAILS THAT ARE PRESENT AT CONSTITUTION MARSH HAVE TOLERATED LEVELS UP TO 1000 PPM. THERE IS NOT ENOUGH INFORMATION TO SAY WHAT IS A SAFE LEVEL OR WHAT LEVEL WILL ADVERSELY AFFECT A PARTICULAR SPECIES.

ISSUE: REFERRING TO THE COMMENT THAT THE ANIMAL LIFE IN THE MARSH APPEARS HEALTHY. IN MY RESEARCH AT THE AREA, I HAVE OBSERVED THE SAME THING, HOWEVER, I HAVE FOUND NOT ONLY HIGH LEVELS OF CD IN ORGANISMS TESTED FROM THE MARSH, BUT ALSO A STRONG NATURAL SELECTION FOR RESISTANCE.

RESPONSE: OUR FIRST CONCERN IS TO STOP THE EC AND ECM FROM ACTING AS AN ONGOING SOURCE OF CD CONTAMINATION BOTH TO THE ECOSYSTEM AND TO MAN.

ISSUE: WHAT IS THE PHYSICAL STRUCTURE FOR THE CLEAN-UP FACILITY GOING TO BE LIKE?

RESPONSE: A HYDRAULIC DREDGE WILL BE PLACED IN THE COVE WHICH WILL PIPE THE WASTE UP THE ROADWAY TO THE MARATHON BATTERY PLANT WHERE IT WILL BE PLACED IN TRUCKS AND REMOVED TO A SANITARY LANDFILL.

ISSUE: DO YOU HAVE ANY IDEA HOW RAPIDLY THE CD WILL DECREASE IN CONSTITUTION MARSH?

RESPONSE: IT IS DIFFICULT TO ESTIMATE HOW FAST RESEDIMENTATION WILL OCCUR SINCE THERE ARE A NUMBER OF SITE SPECIFIC VARIABLES THAT CAN INFLUENCE RESEDIMENTATION. HOWEVER, OUR CONSERVATIVE ESTIMATE IS THAT WE CAN EXPECT 1 TO 2 MILLIMETERS PER ANNUM.

ISSUE: WHAT TYPE OF DREDGE DO YOU INTEND TO USE?

RESPONSE: WE WILL USE A MUD CAT.

ISSUE: IS THERE GOING TO BE SHEET PILING TO KEEP DOWN TURBIDITY?

RESPONSE: DIKES OR SILT CURTAINS WILL BE USED TO REDUCE TURBIDITY.

ISSUE: WHY DO YOU ASSUME THAT YOU CAN FIND A FACILITY TO ACCEPT THE WASTE FROM THE MARATHON BATTERY SITE WHEN THERE HAS BEEN SUCH A PUBLIC OUTCRY AGAINST THE DISPOSAL OF HAZARDOUS WASTE CONTAINING PCB'S FROM ANOTHER NEARBY HAZARDOUS WASTE SITE?

RESPONSE: THE DIFFERENCE HERE IS BECAUSE THE WASTE WILL HAVE BEEN FIXATED, IT WILL NO LONGER BE CONSIDERED A HAZARDOUS WASTE. NON-HAZARDOUS WASTES, UNLIKE PCB'S POSE MINIMAL RISK TO THE ENVIRONMENT AND CAN THUS BE DISPOSED OF AT STANDARD LICENSED MUNICIPAL LANDFILLS.

ISSUE: ROUGHLY HOW MUCH CONTAMINATION ARE WE TALKING ABOUT?

RESPONSE: IT IS ESTIMATED THAT 62,000 CUBIC YARDS WILL NEED TO BE REMOVED FROM ECM AND ANOTHER 68,000 CUBIC YARDS FROM EC UNDER THE PREFERRED ALTERNATIVES.

REMEDIAL ALTERNATIVE PREFERENCES

ISSUE: I THINK THE ISSUE OF THE REMOVAL OF THE CD IS VERY WISE. HOW CONFIDENT ARE YOU IN THE REMOVAL PROCESS AND THAT WE WILL NOT BE CREATING A NEW SUPERFUND SITE DOWN THE PIKE, WHERE WILL THE STUFF GO AND WHAT IS THE FIXATION PROCESS?

RESPONSE: THE FIXATION PROCESS IS WHERE YOU TIE DOWN THE HAZARDOUS PARTICLES SO THAT THEY WON'T LEACH OUT. THEN THE REMOVAL PROCESS IS THROUGH HYDRAULIC DREDGING WHICH IS A WELL PROVEN TECHNOLOGY. THE FIXATION AND DREDGING PROCESSES ARE VERY RELIABLE AND PROVEN TECHNOLOGIES. THEN THE WASTES WILL BE TRUCKED TO AN APPROPRIATE LICENSED MUNICIPAL LANDFILL.

ISSUE: HOW ARE WE CONFIDENT THAT IT WILL NOT LEACH OUT OF A MUNICIPAL LANDFILL?

RESPONSE: DURING LABORATORY TESTS THE CD WASTES HAVE BEEN SHOWN NOT TO LEACH SIGNIFICANTLY AFTER BEING FIXATED. IN FACT, THE FIXATED WASTES ARE NO LONGER CONSIDERED TOXIC AND CAN BE TREATED AS NORMAL WASTE PRODUCTS.

ISSUE: IS THERE A LANDFILL AVAILABLE TO RECEIVE THE WASTES?

RESPONSE: YES. PRELIMINARILY WE HAVE EXPLORED OPTIONS FOR OFF-SITE DISPOSAL OF THE WASTES AT PROPERLY LICENSED FACILITIES UNDER THE ALTERNATIVE THAT THE WASTE HAS BEEN FIXATED AND THUS CAN BE TREATED AS A NON-HAZARDOUS WASTE, AND UNDER THE ALTERNATIVE THAT IT WOULD NEED TO BE TREATED AS A HAZARDOUS WASTE.

ADDITIONAL INVESTIGATIONS AND NEGOTIATIONS ON THIS ISSUE WILL NEED TO OCCUR DURING THE REMEDIAL DESIGN PHASE OF THE PROJECT.

COST AND SCHEDULING ISSUES

ISSUE: WHAT IS THE PREFERRED ALTERNATIVE GOING TO COST?

RESPONSE: THE PREFERRED ALTERNATIVE WILL COST APPROXIMATELY $40 MILLION.
EFCM $20.13 MILLION
EFC $19.07
CM $950,000.

ISSUE: WHY IS IT GOING TO COST $950,000 FOR THE NO ACTION ALTERNATIVE?

RESPONSE: THE $950,000 INCLUDES 30 YEARS OF MONITORING AND THE FIGURES FOR EC AND ECM ALSO INCLUDE 30 YEARS OF MONITORING.

ISSUE: WHAT IS THE STATUS OF FUNDING FOR THIS PROJECT AND FOR OTHER SUPERFUND SITES IN GENERAL?

RESPONSE: WE ARE HOPING THAT CONGRESS WILL REAUTHORIZE SUPERFUND SHORTLY AFTER IT RETURNS TO SESSION ON SEPTEMBER 8, 1986. AS YOU KNOW THEY ARE NOW IN RECESS.

ISSUE: HOW MUCH HAVE YOU SPENT ON THE SITE SO FAR?

RESPONSE: WORK BY NYSDEC'S CONSULTANT ACRES ON THE RI/FS COST $700,000. THE SUPPLEMENTAL RI/FS BY EBASCO FOR AREA I HAS COST APPROXIMATELY $500,000 AND THE SUPPLEMENTAL RI/FS FOR AREA II WILL COST APPROXIMATELY $200,000-$300,000. ALTHOUGH THIS SEEMS LIKE A LOT OF MONEY, THERE HAS BEEN OVER 2,000 SAMPLES TAKEN OVER THE LAST TWO YEARS.

ISSUE: HOW LONG WILL IT TAKE BEFORE THE SITE IS ACTUALLY CLEANED UP?

RESPONSE: THE REMEDIAL DESIGN PHASE WILL TAKE 9-12 MONTHS AND THE ACTUAL REMEDIAL ACTION, I.E., CLEANUP WILL TAKE 1 1/2 TO 2 YEARS.

ISSUE: THE SUPPLEMENTAL RI/FS FOR THE MARATHON BATTERY SITE IS AVAILABLE AT THE PHILLIPSBURG TOWN HALL. WHAT IS THE PROCEDURE FROM THIS POINT?

RESPONSE: EPA WILL BE RECEIVING COMMENTS FROM THE PUBLIC THROUGH SEPTEMBER 15, 1986. THESE COMMENTS SHOULD BE SENT TO:

MR. JOEL SINGERMAN, PROJECT MANAGER
NEW YORK/CARIBBEAN REMEDIAL ACTION BRANCH
U. S. ENVIRONMENTAL PROTECTION AGENCY
26 FEDERAL PLAZA, ROOM 747
NEW YORK, NEW YORK 10278.

EPA WILL THEN EVALUATE THOSE COMMENTS AND RECOMMEND TO THE REGIONAL ADMINISTRATOR A PREFERRED ALTERNATIVE FOR CLEAN-UP. IF MR. CHRIS DAGGETT, WHO IS EPA'S REGIONAL ADMINISTRATOR FOR REGION II CONCURS, HE WILL ISSUE A RECORD OF DECISION (ROD) THAT IS THE LEGAL DOCUMENT DESCRIBING THE METHOD OF CLEAN-UP TO BE UTILIZED AT THE MARATHON BATTERY SITE.

ISSUE: ASSUMING THE PUBLIC COMMENT PERIOD ENDS AND EPA MAKES ITS RECOMMENDATION TO THE REGIONAL ADMINISTRATOR, WHAT IS THE CHANCES THAT SOMETHING WILL ACTUALLY OCCUR?

RESPONSE: A LOT WILL DEPEND ON WHAT OCCURS IN CONGRESS WITH THE REAUTHORIZATION OF SUPERFUND.

ISSUE: WHAT IF SUPERFUND IS REAUTHORIZED? WHEN CAN WE SEE SOME ACTION?

RESPONSE: ASSUMING THAT REAUTHORIZATION OCCURS, EPA CAN PROBABLY AUTHORIZE A CONTRACTOR WITHIN 6 WEEKS TO UNDERTAKE THE REMEDIAL DESIGN WORK WHICH WILL TAKE APPROXIMATELY 9 MONTHS.

ISSUE: IS THERE A RISK THAT THIS PROJECT WILL BE SET ASIDE SO THAT EPA CAN ADDRESS OTHER PRIORITIES?

RESPONSE: AS LONG AS SUPERFUND IS REAUTHORIZED AND THE REGIONAL ADMINISTRATOR CONCURS WITH THE PREFERRED ALTERNATIVE BY ISSUING THE ROD, THIS PROJECT WILL RECEIVE THE SAME PRIORITY AS ALL OTHER EPA PROJECTS IN THIS REGION AT THE SAME RATE OF COMPLETENESS.

ISSUE: ARE THESE COSTS ACTUAL COSTS?

RESPONSE: THESE COSTS ARE ORDER OF MAGNITUDE AND WILL BE FURTHER DEFINED, DURING THE REMEDIAL DESIGN PHASE.

REMAINING CONCERNS

ISSUE: WE LIVE ON CONSTITUTION DRIVE AND OUR BACKYARDS ARE ADJACENT TO THE MARATHON BATTERY PLANT FACILITY AND FOR 6 YEARS WE HAVE WAITED FOR OUR YARDS TO BE TESTED BY SOIL SAMPLES. WHY HASN'T THIS HAPPENED AND IS IT GOING TO OCCUR?

RESPONSE: MARATHON BATTERY PLANT FACILITY IS IN THE AREA II COMPONENT OF THE SUPPLEMENTAL RI/FS WHICH IS CURRENTLY UNDER WAY AND IS SCHEDULED FOR COMPLETION NEXT SPRING. SOIL SAMPLES FROM THE YARDS ALONG CONSTITUTION DRIVE ARE SCHEDULED SOMETIME IN THE NEXT TWO TO FOUR WEEKS.

ISSUE: IT SEEMS THE EPA IS MORE INTERESTED IN THE ANIMAL LIFE THAN PEOPLE BECAUSE IT'S TAKEN YOU SO LONG TO TEST THE YARDS WHERE PEOPLE LIVE.

RESPONSE: THE REASON THAT WE HAVE NOT PREVIOUSLY SAMPLED THE YARDS IS BECAUSE WE HAVE HAD NO REASON TO BELIEVE MIGRATION OF CONTAMINANTS HAS OCCURRED OFF OF THE MARATHON BATTERY FACILITY SITE. HOWEVER, IT HAS BEEN AND IS EPA'S INTENTION TO DO SOIL SAMPLES ALONG THE YARDS OF CONSTITUTION DRIVE. EPA'S TECHNICAL ASSISTANCE TEAM (TAT), WILL BE CONDUCTING SOIL SAMPLING IN THE NEXT 2-4 WEEKS ALONG CONSTITUTION DRIVE.

ISSUE: ISN'T THERE A HIGH CONCENTRATION OF CONTAMINATION NEAR THE COLD SPRING DOCK AREA?

RESPONSE: YES. THAT IS BEING INVESTIGATED UNDER THE AREA II INVESTIGATION.

ISSUE: WHAT AREAS WILL BE EXAMINED IN THE AREA II SUPPLEMENTAL RI/FS?

RESPONSE: MARATHON BATTERY PLANT FACILITY, WEST FOUNDRY COVE, AND THE AREA AROUND COLD SPRING PIER.

COMMENTS
RECEIVED

DEPARTMENT OF THE ARMY

FEBRUARY 11, 1986

SUPERFUND BRANCH
ENGINEERING DIVISION

MR. JOEL SINGERMAN
PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA, ROOM 747
NEW YORK, NEW YORK 10278

DEAR MR. SINGERMAN:

ENCLOSED ARE THE COMPLETE TECHNICAL REVIEW COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION AND DRAFT FEASIBILITY STUDY OF REMEDIAL ACTIONS, MARATHON BATTERY SITE, COLD SPRINGS, NEW YORK.

DUE TO THE LIMITED AMOUNT OF TIME AND FUNDS AVAILABLE FOR THIS REVIEW, THE CORPS OF ENGINEERS COULD ONLY PERFORM A CURSORY REVIEW OF THE SUBJECT DOCUMENTS. AFTER REVIEWING THE DOCUMENTS, ALL PERSONS PROVIDING COMMENTS FELT IT MAY BE APPROPRIATE TO MEET AND FURTHER DEFINE THE SPECIFIC INFORMATION THE ENVIRONMENTAL PROTECTION AGENCY IS REQUESTING AND TO DETERMINE THE CORPS OF ENGINEERS INVOLVEMENT ON THIS PROJECT.

PLEASE PROVIDE A WRITTEN RESPONSE TO THESE COMMENTS SO THAT WE KNOW OF THEIR DISPOSITION.

IF YOU HAVE ANY QUESTIONS OR NEED ADDITIONAL INFORMATION, PLEASE CONTACT MR. CHARLES J. ADKINS OF MY STAFF AT FTS 758-5221.

SINCERELY,

PAUL D. BARBER
CHIEF, ENGINEERING DIVISION

ENCLOSURE.

WESEE-S

24 JANUARY 1986

MEMORANDUM FOR RECORD

SUBJECT: REVIEW OF RIS/FS FOR MARATHON BATTERY SUPERFUND SITE

1. I HAVE REVIEWED THE SUBJECT DOCUMENTS IN LIGHT OF THE SCOPE OF WORK (S.O.W.) PROVIDED TO US BY THE KANSAS CITY DISTRICT. THE FOLLOWING GENERAL COMMENTS ARE OFFERED IN REGARD TO THE DOCUMENTS:

A. THE CONSULTANT, ACRES INTERNATIONAL, DID A GOOD JOB OF SCREENING POTENTIAL TECHNOLOGIES FOR REMOVING/DISPOSING OF THE SEDIMENT CONTAMINATED WITH HEAVY METALS FROM THE MARATHON BATTERY PLANT. THE METHOD USED FOR SCREENING IS SIMILAR TO WHAT WE PLAN TO USE FOR THE PUGET SOUND DREDGING DISPOSAL ANALYSIS (PSDDA) STUDY. HOWEVER, IT IS BASICALLY A LITERATURE REVIEW -- COUPLED WITH AN ENGINEERING JUDGMENT – TYPE OF ANALYSIS. NO BENCH SCALE OR LABORATORY STUDIES WERE PERFORMED ON THE CONTAMINATED SEDIMENT. ALSO, THERE WAS LITTLE DISCUSSION OF POTENTIAL DISPOSAL SITES FOR THE CONTAMINATED DREDGED MATERIAL. THE FS (P. 13-4) RECOGNIZED THAT THERE WERE UNCERTAINTIES INVOLVED IN DESIGN AND RECOMMENDED FURTHER LABORATORY/BENCH SCALE TESTING PRIOR TO IMPLEMENTATION. THIS TYPE OF TESTING MAY ALSO BE REQUIRED TO ESTABLISH ENGINEERING FEASIBILITY.

B. THE SEDIMENT CHARACTERIZATION DATA APPEARS ADEQUATE FOR THE MORE CONTAMINATED AREAS, I.E. EAST COVE, BUT IS LIMITED FOR SOME OF THE OUTLYING AREAS (P. 11-1, 13-1, FS).

C. THE FS SCREENED VARIOUS DREDGES AND RATED THE HORIZONTAL AUGER-CUTTER AND CUTTERHEAD PIPELINE SUCTION AS ABOVE AVERAGE TECHNOLOGIES FOR THE JOB. HOWEVER, SEDIMENT RESUSPENSION WAS NOT A PRIMARY CRITERIA FOR EVALUATION, AND WE MAY NOT AGREE WITH ACRES INTERNATIONAL'S RATING OF DREDGES. THEIR SELECTION SEEMED TO BE BASED ON AVAILABILITY MORE THAN ANYTHING ELSE.

D. THE THREE RECOMMENDED ALTERNATIVES INVOLVE REMOVAL OF SEDIMENT BY DREDGING AND (1) TREATING THE SEDIMENT, (2) CALCINATING THE SEDIMENT AND (3) FIXATING THE SEDIMENT, FOLLOWED BY DISPOSAL EITHER IN THE DREDGED AREA IF TREATED TO A NONHAZARDOUS CONDITION, OR HAULED TO A HAZARDOUS WASTE LANDFILL OTHERWISE. CONTAINMENT OF THE DREDGED MATERIAL ONSITE WAS NOT CONSIDERED AS I UNDERSTAND IT.

E. NO TREATABILITY STUDIES WERE PERFORMED TO ENABLE EVEN A PRELIMINARY ENGINEERING DESIGN FOR ANY OF THE SELECTED ALTERNATIVES.

2. THE S.O.W. REQUIRED THAT WE IDENTIFY AND EVALUATE EFFECTIVE MEANS OF CONTAINING CONTAMINATED SEDIMENTS. I DON'T THINK THE AREAS IN THE 100 PPM RANGE CAN BE "CONTAINED.". PERHAPS THE HOT SPOTS CAN BE SEGREGATED AND FIXED IN PLACE, BUT TO DO THIS ADDITIONAL GEOTECHNICAL DATA AND BENCH SCALE/PILOT SCALE FIXATION DATA WOULD BE REQUIRED.

3. THE S.O.W. ALSO ASKED THAT WE DETERMINE THE EFFECTIVENESS/EFFICIENCY OF CONTAMINATED SEDIMENT DREDGING. AT PRESENT, THIS ASSESSMENT WOULD BE A JUDGMENT CALL WITHOUT MORE SITE SPECIFIC EVALUATIONS. I WOULD NOT EXPECT IT TO BE 100% EFFICIENT, BUT MULTIPLE PASSES SHOULD SIGNIFICANTLY LOWER THE CONTAMINATION COMPARED TO EXISTING CONDITIONS.

D. E. AVERETT, P.E.
ENVIRONMENTAL ENGINEER
WATER SUPPLY AND WASTE TREATMENT GROUP.

WESEE-R

29 JANUARY 1986

MEMORANDUM FOR RECORD

SUBJECT: REVIEW OF FEASIBILITY STUDY FOR MARATHON BATTERY SUPERFUND SITE

I HAVE PERFORMED A VERY SUPERFICIAL REVIEW OF THE FEASIBILITY STUDY DUE TO THE VERY BRIEF PERIOD IN WHICH THE DOCUMENTATION WAS AVAILABLE FOR MY INSPECTION. IN GENERAL, I FELT THAT THE STUDY WAS LACKING IN DATA AND UNDERSTANDING OF THE EFFECTS OF VARIOUS ALTERNATIVES. SPECIFICALLY, I BELIEVE THAT MORE AND DEEPER CORES ARE NEEDED TO DEFINE THE AREA OF CONTAMINATION. THE POTENTIAL FOR LEACHING AND MOBILIZATION IN BOTH AQUATIC AND UPLAND ENVIRONMENTS SHOULD BE ADDRESSED. THE EFFECTS OF VARIOUS TECHNOLOGIES SUCH AS PLANT HARVESTING ON CONTAMINANT RELEASE SHOULD BE PRESENTED. SOME CONCLUSIONS WERE PUZZLING SUCH AS IF IT IS DESIRABLE TO TREAT THE LOW LEVEL CONTAMINATED SEDIMENTS, WHY IS IT UNDESIRABLE TO TREAT THE "HOT SPOTS"? THE RATING SCHEME DOES NOT NECESSARILY PROVIDE A BEST ALTERNATIVE. VERY LITTLE DIFFERENCE OCCURRED BETWEEN THE RATINGS OF DIFFERENT ALTERNATIVES. A HIERARCHY OF CRITERION WOULD BE MORE USEFUL. CALCINATION AND EXTRACTION OF SEDIMENT MAY BE QUITE DIFFERENT THAN THAT OF SLUDGES AND THE VOLUMES ARE GENERALLY MUCH LARGER WHICH CAN AFFECT TECHNICAL ADEQUACY.

ROUTING:
WALSKI
PALERMO
MONTGOMERY
KEELEY
HARRISON
VAN NORMAN

CF:
FRANCINGUES.

PAUL R. SCHROEDER, PHD, PE
ENVIRONMENTAL ENGINEER
WATER RESOURCES ENGINEERING GROUP

MEMORANDUM FOR RECORD

SUBJ: REVIEW OF DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT ON MARATHON BATTERY, COLD SPRINGS, NEW YORK

FROM: JAMES H. BRANNON AND THOMAS L. HART

1. THERE IS A LOT OF INFORMATION AVAILABLE ON THE VERTICAL AND HORIZONTAL DISTRIBUTION OF TOTAL CADMIUM, COBALT, AND NICKEL IN FOUNDRY COVE SEDIMENTS AS WELL AS IN FLORA AND FAUNA IN THE AREA. THIS INFORMATION IS INSUFFICIENT TO ALLOW AN EFFECTIVE EVALUATION OF THE TECHNICAL MERITS AND ENVIRONMENTAL EFFECTS OF THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION FOR THE SITE.

2. THE OBJECTIVE OF OUR REVIEW WAS TO EVALUATE THE AVAILABLE DATA FROM THE STANDPOINT OF EXPANDING THE FEASIBILITY STUDY. GIVEN THE AVAILABLE DATA, THIS CANNOT BE DONE. INSUFFICIENT DATA EXISTS TO ALLOW DETERMINATION OF THE ENVIRONMENTAL IMPACTS OF DREDGING AND DISPOSAL ACTIVITIES. DIFFERENT KINDS OF INFORMATION THAN THAT PRESENTLY AVAILABLE WOULD BE NEEDED TO CONDUCT SUCH A TECHNICAL EVALUATION.

3. AN ADDITIONAL CAUSE OF CONCERN IS THE 100 UG/G LEVEL OF CADMIUM CHOSEN PRIOR TO CONDUCTING THE FEASIBILITY STUDY AS A CLEANUP CUTOFF LEVEL. THIS IS A VERY HIGH LEVEL OF CADMIUM IN SEDIMENTS.

JAMES M. BRANNON

THOMAS L. HART.

WESES-R

16 JANUARY 1986

MEMORANDUM FOR RECORD

SUBJECT: DOTS REQUEST NO. 86-82; MARATHON BATTERY, COLD SPRINGS, NY

1. DATA APPEARS TO BE EXTENSIVE. I'M CONCERNED ABOUT THE TARGET OF 100 PPM CADMIUM (CD) AS WAS USED IN THE FEASIBILITY STUDY. SINCE SURROUNDING LESS CONTAMINATED SEDIMENTS APPEAR TO RANGE IN THE 3-5 PPM CD, PERHAPS A MORE ENVIRONMENTALLY WISE TARGET OF 10 PPM CD SHOULD BE EVALUATED.

2. ADDITIONAL SEDIMENT SAMPLING TO DEPTHS THAT SHOW REDUCED CD CONTENTS OF BELOW 100 PPM, PERFERABLY AROUND 10 PPM, IS NEEDED AS RECOMMENDED.

CHARLES R. LEE
CHIEF, CONTAMINANT MOBILITY
AND REGULATORY CRITERIA GROUP.

DISPOSITION FORM

WESER-W LONG-TERM HYDRAULIC IMPACTS OF CONSTITUTION MARSH

TO C/EE-S/NORM FRANCINGUES FROM D. R. SANDERS, SR. DATE 24 JAN 86
WTHG SANDERS/EAS/3983

1. I BRIEFLY REVIEWED THE DRAFT REMEDIAL INVESTIGATION REPORT ON THE MARATHON BATTERY PROJECT WITH RESPECT TO LONG-TERM HYDRAULIC IMPACTS OF DREDGING CONSTITUTION MARSH. THE FOLLOWING INFORMATION APPEARS TO BE NEEDED:

A. CHANGES IN HYDROLOGIC REGIME OF THE MARSH RESULTING FROM DREDGING OPERATIONS.

B. RATE AND AMOUNT OF SEDIMENT ACCRETION IN THE MARSH RESULTING FROM DREDGING.

C. DEGREE OF CHANGE IN SALINITY OF WATER ENTERING THE MARSH AS A RESULT OF THE CHANGES IN HYDROLOGIC REGIME. WILL THE CHANGE (IF ANY) IN HYDROLOGIC REGIME INCREASE, DECREASE, OR HAVE NO EFFECT ON THE SEASONAL EXPOSURE OF THE SITE TO THE SALT-WATER WEDGE?

2. THE ABOVE INFORMATION WILL BE NECESSARY TO DETERMINE POTENTIAL CHANGES IN VEGETATION OF CONSTITUTION MARSH AS A RESULT OF THE DREDGING OPERATION.

3. WITH RESPECT TO CADMIUM LEVELS, DREDGING OPERATIONS COULD RESULT IN INCREASED CADMIUM LEVELS IN SEDIMENTS IN THE NORTHERN PORTION OF CONSTITUTION MARSH UNLESS MEASURES ARE TAKEN TO CONTROL SEDIMENTS DURING DREDGING OPERATIONS. THE MARSH HAS BEEN SERVING AS A SEDIMENT TRAP IN THE PAST (BASED ON THE HIGHER CONCENTRATIONS OF CADMIUM IN THE NORTHERN PORTION OF THE MARSH). CONSIDERING CONCENTRATIONS OF CADMIUM ALREADY PRESENT, EFFORTS SHOULD BE TAKEN TO PREVENT SEDIMENTS FROM DREDGING OPERATIONS FROM ENTERING THE MARSH (PRIMARILY DUE TO KNOWN EFFECTS OF CADMIUM ON FAUNA THAT UTILIZE THE MARSH).

SANDERS.

JANUARY 15, 1986

WESHE-P

MEMORANDUM FOR RECORD
SUBJECT:

COMMENTS ON EPA'S REQUEST FOR MRKED-S'S ASSISTANCE ON COLD SPRING, NEW YORK FEASIBILITY STUDY

1. A FEASIBILITY STUDY (FS) OF REMEDIAL ACTIONS FOR THE MARATHON BATTERY FEDERAL SUPERFUND SITE AT COLD SPRING, NEW YORK WAS PERFORMED BY ACRES INTERNATIONAL, INC. THE U.S. EPA HAS REQUESTED TECHNICAL ASSISTANCE FROM THE COE TO EXPAND THE STUDY BY FURTHER EVALUATIONS. TASK 4 OF THE EPA'S REQUESTED SCOPE OF WORK IS STATED AS:

"4. DETERMINE THE LONG-TERM HYDRAULIC IMPACTS ON CONSTITUTION MARSH ASSOCIATED WITH DREDGING AND/OR CONTAINING THE CONTAMINATED SEDIMENTS IN FOUNDRY COVE.".

CONSTITUTION MARSH (CM) IS SITUATED BETWEEN FOUNDRY COVE ON THE NORTH AND SOUTH COVE ALONG THE EAST BANK OF THE HUDSON RIVER, ACROSS FROM WEST POINT N.Y. THESE THREE AREAS ARE HYDRAULICALLY CONNECTED, WITH A NET TIDAL FLOW FROM SOUTH TO NORTH. SEDIMENTS ARE HIGHLY CONTAMINATED WITH HEAVY METALS AND VARIOUS ALTERNATIVES WERE DEVELOPED AND RANKED BY THE FS FOR REMOVING, FIXING, TREATING, AND/OR CONTAINING THE CONTAMINATED SEDIMENTS.

2. THE FS DID NOT ADDRESS HYDRAULIC IMPACTS ON CM ASSOCIATED WITH DREDGING OF CONTAINMENT, AND THE SPECIFIC CONCERNS WERE NOT IDENTIFIED BY EPA IN THE REQUEST FOR ASSISTANCE. HYDRAULIC IMPACTS ON CM MIGHT INCLUDE:

- BANK EROSION AND LOSS OF MARSH AREA AS A RESULT OF ALTERED TIDAL AND FLOOD FLOWS,
- CHANNEL EROSION IN THE AREA ADJACENT TO FOUNDRY COVE OR ELSEWHERE,
- MARSH SURFACE EROSION AND INCREASED LOSS OF PARTICULATE MATTER DURING FLOOD FLOWS,
- CHANGE IN MARSH PERIOD OF INUNDATION AS A RESULT OF ALTERED TIDAL AND FLOOD STAGES OR ALTERED LONG TERM MARSH SEDIMENTATION RATES,
- CHANGE IN SALINITY CONDITIONS ON THE MARSH DUE TO ALTERED CIRCULATION PATTERNS.

3. THE FS DID NOT GENERATE OR COMPILE ANY INFORMATION ON CM OR SOUTH COVE. AS A FIRST STEP IN EVALUATING THE ABOVE POSSIBLE IMPACTS, INFORMATION MUST BE COMPILED OR GENERATED TO IMPROVE THE DATA BASE FOR THE ENTIRE SYSTEM (FOUNDRY COVE, CM, AND SOUTH COVE). THE INFORMATION REQUIRED FOR THE EVALUATION WOULD PROBABLY INCLUDE HISTORICAL CHARTS OR MAPS; ELEVATION DATA; CHANNEL CROSS SECTIONS; TIME HISTORIES OF FLOOD LEVELS AND TIDAL LEVELS FOR THE ENTIRE SYSTEM; AND SALINITY DATA OVER SEVERAL YEARS. IT IS NOT KNOWN HOW MUCH INFORMATION IS AVAILABLE, OR THE RESOLUTION REQUIRED FOR THE EVALUATIONS, OR THE TIME PERIOD AVAILABLE TO COLLECT FURTHER DATA.

4. FURTHER DISCUSSIONS WILL BE NECESSARY BETWEEN EPA, MRK, NYDEC, AND WES BEFORE A DETAILED STUDY PLAN CAN BE ESTABLISHED.

ALLEN M. TEETER

RTG: FISACKERLY, MCANALLY, SAGER, HERRMANN, TEETER

CF: FRANCINGUES EE-S.

MRKED-HW

10 FEBRUARY 1986

MEMORANDUM FOR ED-HW FILES

SUBJECT: REVIEW OF THE FEASIBILITY STUDY FOR MARATHON BATTERY SITE, COLD SPRINGS, NEW YORK

THE FOLLOWING RESPONSES ARE IN LIKE NUMERICAL ORDER AS REQUESTED IN THE INITIAL DRAFT FOR TECHNICAL ASSISTANCE.

1. IDENTIFY AND EVALUATE EFFECTIVE MEANS OF CONTAINING THE SITE'S SEDIMENTS CONTAMINATED WITH 100 PPM CADMIUM OR GREATER.

A. THERE ARE NO COMPLETELY FOOL PROOF SOLUTIONS FOR CONTAINMENT OF THE CONTAMINATED SEDIMENTS AND METALS, WHEREIN SOME DEFICIENCIES ARE NOT INHERENT, NOR OTHER WHAT IFS CANNOT BE REAL OR IMAGINARY. THE FS REPORT'S RETRIEVED SEDIMENT CORE DATA, WITH FEW EXCEPTIONS, SHOW THAT THE METAL CONCENTRATIONS DECREASE WITH DEPTH. SOIL CHEMISTRY ALSO WILL INDICATE THAT CADMIUM, NICKEL, AND COBALT ARE NOT HIGHLY MOBILE IN SOILS OR IN AQUEOUS SOLUTIONS. THEREFORE PERCOLATION OR INFILTRATION INTO THE GROUND WATER OR UNDERLYING STRATA OVER TIME IS NOT HIGHLY RELEVANT TO THE PROSPECT OF CONTAINMENT. THERE EXISTS THEN NUMEROUS POSSIBILITIES, EITHER PARTIALLY OR WHOLLY, TO CONTAIN THE CONTAMINANTS AND SEDIMENTS. THE WHOLE CONTAINMENT OF THE CONTAMINATED AREAS OF EAST COVE AND THE NORTHERN MARSH AREA CAN BE ISOLATED BY SHEET PILING, OR A COMBINATION OF SHEET PILING AND PROPERLY CONSTRUCTED LEVEES. CHOICES CAN BE MADE FOR RECLAMATION (I.E., DIFFERENT LAND USES), USE THE AREA TO POND STORM RUNOFF, REMOVE THE CONTAMINATED MATERIALS, OR TO OVERLAY THE CONTAMINATED MATERIALS WITH AN IMPERVIOUS BLANKET. IF THE MATERIALS WERE REMOVED OR COVERED WITH A BLANKET, THE AREAS COULD BE REOPENED TO TIDAL FLOWS. IF THE AREAS WERE TO BE UTILIZED AS A PONDING AREA FOR STORM RUNOFF, THE BED MATERIALS COULD BE LEFT AS IS AND A CONTROLLED ENVIRONMENTALLY SELECTED NOTCHED WEIR WOULD ALLOW EXCESS WATER TO PASS TO THE HUDSON RIVER. THE WEST - EAST COVE RAILROAD CROSSING WOULD BE THE DESIRABLE LOCATION FOR THE NOTCH. (SEE WRITEUP IN 3 AND 4 FOR TRANSPORT CAPACITY OF MATERIALS.). NATURAL REDUCTION OF THE METALS THROUGH BIOACCUMULATION BY THE ENTRAPPED FLORA AND FAUNA COULD PROCEED AS PRESENTLY EXIST. IF THE AREA OR AREAS CONTAINED, AFTER REMOVAL OF THE CONTAMINATED MATERIALS ARE OVERLAYED WITH AN IMPERVIOUS BLANKET, THE SHEET PILING CAN EITHER BE REMOVED OR LEFT IN PLACE WITH NOTCH AT THE EAST - WEST COVE RAILROAD CROSSING AND AT THE EAST COVE INTERFACE WITH CONSTITUTION MARSH. THIS WILL ALLOW TIDAL FLOWS TO RESUME. RECLAMATION FOR LAND USE CHANGES IS SELF EXPLANATORY.

B. PARTIAL CONTAINMENT ALSO APPEARS TO BE A VIABLE REMEDIAL SOLUTION. FOUNDRY CREEK COULD BE CHANNELIZED BY DREDGING OR EXCAVATING ALONG AN ALIGNMENT THROUGH THE LEAST CONTAMINATED AREA OF EAST COVE TO THE EAST - WEST COVE RAILROAD CROSSING. THE STORM SEWERS COULD BE EXTENDED OR DITCHED TO THE NEW CHANNEL. THE CONTAINMENT AREAS CAN BE LEVEED OR SHEET PILED AND THE CHANNEL SPOILS PLACED WITHIN. THE CONTAINMENT AREA OR PARTIAL CONTAINMENT AREAS CAN BE CHOSEN AT THE NORTHERN OR NORTHEAST EDGE OF EAST COVE OR AT THE NORTHERN OR NORTHWEST EDGE OF CONSTITUTION MARSH. THE ISOLATED CONTAINMENTS CAN BE RECLAIMED OR FILLED WITH AN IMPERVIOUS BLANKET. EACH OF THESE FORMULATED ALTERNATIVES, AS WELL AS THOSE PROPOSED IN THE FS, WILL IMPACT ON THE RESIDUAL AREAS AND MAY NOT BE ACCEPTABLE TO THE LOCAL COMMUNITY OR TO THE STATE OF NEW YORK, REGARDLESS OF THEIR BENEFITS OR ECONOMIC COSTS.

C. BECAUSE OF THE SITE CONDITIONS, (I.E., MORPHOLOGY, TOPOGRAPHY, AND THEIR DIRECT HUDSON RIVER INFLUENCE) AT THE PIER SITE AND WEST COVE, ALONG WITH THE LIMITED DATA, CONTAINMENT OF THESE AREAS SEEMS TO BE AN IMPRACTICABLE SOLUTION.

D. AS A NOTE, TO THIS PART AS WELL AS THE TOTAL REPORT, IF THE CONTRACTOR HAD DESIGNED HIS DATA COLLECTION SAMPLING PROGRAM TO ACHIEVE THE SPECIFIED SCOPE OF WORK RATHER THAN DUPLICATE OR EXPAND ON THE BIOLOGICAL STUDIES OF OTHERS, MORE USABLE AND QUANTIFIABLE DATA COULD HAVE BEEN OBTAINED TO BETTER PREPARE POSITIVE EVALUATIONS FOR EACH OF THE CONTAMINATED SITES.

2. IDENTIFY AND EVALUATE EFFECTIVE MEANS OF CONTAINING CONTAMINATED SEDIMENT HOT SPOTS.

A. HOT SPOT CONTAINMENT IS MORE ADAPTABLE TO THE WEST COVE AREA AND THE PIER SITE. THE FOLLOWING IS ONLY

SLIGHTLY DIFFERENT THAN 1 ABOVE. ALTHOUGH THE SITES IDENTIFIED WOULD BE MORE SUITABLE TO DREDGING THAN CONTAINMENT. HOWEVER, ENCLOSING OR RINGING THESE SPOTS WITH SHEET PILING AND BACKFILLING WITH IMPERVIOUS MATERIALS AND A CONCRETE CAP IS AN ALTERNATIVE. THE CAPS SHOULD BE PLACED AT AN ELEVATION SUCH THAT THEY WOULD NOT BECOME A NAVIGATION HAZARD. THE ENCASEMENTS AT THE PIER SITE, BOTH UPSTREAM AND DOWNSTREAM, WILL ACT AS DIKES OR JETTIES DEFLECTING HUDSON RIVER FLOWS AWAY FROM THE COLD SPRING OUTFALL. THE WATER QUALITY DATA, (TSS), DOES NOT INDICATE THAT THE SUSPENDED LOADS WOULD GENERATE A MAINTENANCE PROBLEM AT THIS LOCATION.

B. BECAUSE OF THE LIMITED DATA NEAR THE PIER SITE, AS WELL AS IN WEST COVE, MORE SAMPLING IS OF NECESSITY TO DETERMINE THE EXISTENCE OF OTHER HOT SPOTS OR IF A MORE UNIFORM CONTAMINATION OF BED MATERIALS EXISTS.

3. DETERMINE THE ANTICIPATED EFFECTIVENESS AND EFFICIENCIES OF SITE-WIDE AND HOT SPOT CONTAMINATED SEDIMENT DREDGING.

A. THERE IS INSUFFICIENT UNDERWATER BED MATERIAL DATA IN THE FURNISHED REPORTS TO EVALUATE WHICH TYPE OF DREDGE COULD BE UTILIZED MOST EFFECTIVELY AND EFFICIENTLY ENVIRONMENTALLY. THE APPARENT CONCEPT OF THE GEOMORPHIC HISTORY OF THE AREA INDICATES THAT A SEMI TO QUASI EQUILIBRIUM STATE EXISTS BETWEEN THE COVES, MARSH, HUDSON RIVER, AND TIDAL FLOWS. THE SEDIMENT LOADINGS FROM THE TRIBUTARY AND THE HUDSON RIVER ARE SLIGHT TO NONEXISTENT; OTHERWISE NATURE WOULD HAVE RECLAIMED THESE BACK WATER AREAS AND THE HEAVY METAL DEPOSITS WOULD HAVE BEEN DEPOSITED OVER WITH THESE DIFFUSED SEDIMENTS. THE EXISTING SEDIMENT DEPOSITS WHICH ARE PRESENTLY OVERLAYING THE GLACIAL DEPOSITS MAY HAVE BECOME CONSOLIDATED, DEPENDING ON LOCAL CLIMATIC AND TIDAL EXPOSURE, OR THESE DEPOSITS MAY HAVE REMAINED IN THEIR ORIGINAL DEPOSITIONAL STATE. SINCE CONSIDERABLE AMOUNTS OF THE GRADATION TAKEN FROM THE UNDERWATER PORTION ARE HIGH IN SILTS AND CLAY MINERALS, EITHER OF THE ABOVE MAY BE TRUE, I.E., CONSOLIDATED OR UNCONSOLIDATED. THEREFORE, BED MATERIALS GRADATION AS WELL AS WET OR DRY DENSITIES (SPECIFIC WEIGHTS) WITH DEPTH WILL BE NEEDED TO DETERMINE WHICH TYPE OF DREDGE COULD OPERATE MOST EFFECTIVELY AND EFFICIENTLY ENVIRONMENTALLY. THIS WILL BE TRUE REGARDLESS OF ISOLATION OR IF THE AREAS ARE NOT ISOLATED DURING DREDGING. HOWEVER, BECAUSE OF SOME OF THE PARAMETRIC DATA GIVEN IN THE REPORT THERE APPEARS TO BE NO SIGNIFICANT REASON FOR CONTAINING OR ISOLATING THE AREA/AREAS DURING DREDGING OPERATIONS. THE HIGHEST TIDAL ENERGY LOCATION WILL BE AT THE WEST - EAST COVE RAILROAD CROSSING. THIS IS A RESTRICTED OR CONTROL GEOMETRY. A REVIEW OF THE SUPPLIED DATA, I.E., THE CONTINUOUS FLUX METER RECORDINGS, ALTHOUGH NOT NEAR THE BOTTOM OF THE CHANNEL OR NEAR BED VELOCITY, AND UTILIZE THIS DATA TO MAKE CURSORY CALCULATIONS INDICATE VERY LITTLE BED SHEAR STRESS EXISTS AND THEREFORE THE HYDRAULIC TRANSPORT CAPABILITY OR STREAM POWER IS NEGLIGIBLE. SINCE NO SUSPENDED SEDIMENT SAMPLES WERE COLLECTED, A REVIEW OF THE WATER QUALITY DATA DOES NOT INDICATE THAT THE TOTAL SUSPENDED SOLIDS, (TSS), CONFIRM THE LACK OF TRANSPORT CAPABILITY. THE HIGHEST CONCENTRATIONS OF METALS OCCUR IN THE VICINITY OF THE OUTFALL SEWERS, I.E., IN EAST COVE AND NEAR THE PIER SITE. THESE HIGH CONCENTRATIONS OF THE METALS ARE INDICATIVE OF DEPOSITION IN PARTICULATE FORMS OF OXIDES OR HYDROXY OXIDES RATHER THAN CLAY MINERAL ELECTROSTATIC SORPTION, ORGANIC LIGANDS OR CHELATES (COMPLEX ION PAIRS) PRECIPITATION FORMS. THEREFORE, THESE METALS ARE STABLE AND PROBABLY HIGHLY INSOLUBLE UNDER EXISTING CONDITIONS. THESE METALS HAVE BEEN DEPOSITED ACCORDING TO GRAVITATIONAL KINETICS. THE RADIAL DISPERSION OR DIFFUSION BECOMES FUNCTIONS OF HYDRAULIC SORTING (GRADATION, FALL VELOCITY) AND COINCIDENTAL TIDAL CONDITIONS, I.E., METAL DISCHARGE DURING EBB TIDE WILL TRANSPORT OR CARRY THE MATERIALS FURTHER INTO THE COVE THAN DURING QUIESCENT PERIODS, WHEREAS FLOOD TIDES WOULD PREVENT MOVEMENT OF THE MATERIALS AWAY FROM THE OUTFALL DURING DISCHARGE. HENCE, IT DOES NOT APPEAR NECESSARY TO ISOLATE THE AREAS DURING DREDGING OPERATIONS.

B. THERE ARE DIFFERENCES OF OPINIONS AND TESTING DATA AS TO WHETHER A CUTTERHEAD TYPE DREDGE OR A MODIFIED SUCTION HEAD (DUSTPAN) DREDGE IS MORE ENVIRONMENTALLY SUITABLE. IN HIGH ENERGY LOTIC ENVIRONS SOME CUTTERHEADS GENERATE A FORWARD TURBIDITY PLUME AS WELL AS THE CURRENT GENERATING A MILDER AFT PLUME. WATER JET SUCTION HEAD DREDGES DO NOT RESUSPEND THE BED MATERIALS IN THESE FAST MOVING STREAMS AND ARE MORE SUITABLE. HOWEVER, THE WATERWAYS EXPERIMENTAL STATION IN ITS DREDGE RESEARCH HAS TESTED AND EVALUATED BOTH A FORM OF CUTTER HEAD AND A DUSTPAN SIDE BY SIDE IN A LESSOR LOTIC ENVIRON OR LESS ENERGY CONDITION. THEY FOUND THE CUTTERHEAD MORE SUITABLE. A NEW DREDGE DESIGNED BY THE DUTCH, WHICH HAS BEEN TESTED FOR HAZARDOUS MATERIALS, BUT NOT FULLY ANALYZED, APPEARS TO BE BY WES'S OBSERVATIONS THE MORE EFFECTIVE AND EFFICIENT FOR REMOVAL OF HAZARDOUS MATERIALS.

C. ALTHOUGH SOME CADMIUM IS EVIDENT (TOTAL AND DISSOLVED) IN THE WATER COLUMN IN EAST COVE, THE WATER QUALITY DATA PRESENTED IN THE TABLES APPEAR TO BE TOO RANDOM TO BE ASSOCIATED WITH THE COVE ALONE. THE MAGNITUDE

DIFFERENCES FROM THE SAMPLES WHICH DID CONTAIN THE CADMIUM MAY BE DUE TO IMPROPER SAMPLING TIME ON THE HYDROGRAPHS, IMPROPER SAMPLING TECHNIQUES BY THE OBSERVER, OR POSSIBLY CONTAMINATED BY THE INTRODUCTION OF BED MATERIALS. SOME SPECIATION VIA HYPOTHETICAL REASONING WAS ATTEMPTED WITH PH CHANGES; HOWEVER, NO THERMODYNAMICS OR KINETICS WERE PRESENTED TO DEMONSTRATE THE SOLUBILITY EFFECTS ON THE CADMIUM.

D. BECAUSE OF THE PHYSICAL AND CHEMICAL PROPERTIES OF THE SEDIMENTS AND THE METAL CONTAMINANTS GLEANED FROM THE ACCOMPANYING OR FURNISHED REPORTS, THERE DOES NOT APPEAR TO BE SUBSTANTIAL REASONS TO ISOLATE OR CONTAIN THE CONTAMINATED AREAS DURING DREDGING. THE DREDGING OPERATIONS CAN BEGIN AND CONTINUE WITHOUT REGARD TO TIDAL EVENTS, SEASONAL AND WATERSHED RUNOFF EVENTS. THE AUTHORS OF THE REPORT APPEARED TO BE PREOCCUPIED WITH THE REROUTING OF THE STORM SEWERS AND FOUNDRY CREEK; HOWEVER, THE ENERGY CONTAINED IN THE FLOW EVENTS ARE READILY DAMPENED TO LOCAL SCOUR HOLES AND/OR BY TIDAL TAILWATER CONTROLS. BECAUSE OF INSUFFICIENT MASS TO SUSTAIN THE ENERGY, THE TRANSPORT OF SUCH EVENTS IS SEVERELY LIMITED. THIS IS MOST EVIDENT BY THE RESIDUAL HIGH CONCENTRATIONS OF THE METALS SHOWN IN THE REPORT IN THE VICINITY OF THESE DRAINAGE SYSTEMS.

4. DETERMINE THE LONG TERM HYDRAULIC IMPACTS ON CONSTITUTION MARSH ASSOCIATED WITH DREDGING AND/OR CONTAINING THE CONTAMINATED SEDIMENTS IN FOUNDRY COVE.

A. DREDGING OF WEST AND EAST COVES OR THE PARTIAL REMOVAL OF CONSTITUTION MARSH WILL HAVE LITTLE MEASURABLE IMPACT ON THE TIDAL HYDRAULICS OF CONSTITUTION MARSH. THE DREDGING ACTIVITY WILL DEEPEN THE COVES, EXTENDING THEIR USEFUL LIVES, BUT WILL HAVE A NEGLIGIBLE EFFECT ON VELOCITY REDUCTION AND THEREFORE WILL NOT ALTER THE ROUTING TIMES INTO CONSTITUTION MARSH. THE INCREASED VOLUME DUE TO DREDGING WILL BE BELOW DAILY HUDSON RIVER STAGES AND THE VOLUME AFFECTED BY TIDAL FLUCTUATION WILL REMAIN ESSENTIALLY CONSTANT. THE CONTROLLING GEOMETRY OF THE TIDAL ROUTINGS IS FIXED AT THE RAILROAD TRESTLES, EAST AND SOUTH; THEREFORE, UNLESS THE EFFECTIVE CONVEYANCE FLOW AREAS ARE DRASTICALLY MODIFIED, NO CHANGES IN THE MARSH TIDAL HYDRAULICS CAN BE ANTICIPATED WITH DREDGING.

B. CONTAINMENT IN ANY FORM WILL DRASTICALLY ALTER THE TIDAL RELATIONSHIP IN CONSTITUTION MARSH. THE FILLING WILL DECREASE THE FLOW AREAS, REDUCE THE EXCHANGEABLE TIDAL VOLUMES, INCREASE BED RESISTANCE, AND WILL CHANGE THE ROUTING TIMES INTO AND OUT OF THE MARSH. CONTAINMENT IN EAST COVE ALONE WILL SHIFT THE DOMINATE TIDAL CONTROL TO THE SOUTH COVE. PARTIAL CONTAINMENT, WITH CHANNELIZATION OF FOUNDRY CREEK, CAN BE DESIGNED TO HAVE A MINIMAL INFLUENCE ON THE EXISTING TIDAL HYDRAULICS IN CONSTITUTION MARSH.

D. UNDER ANY CIRCUMSTANCES, DREDGING OR CONTAINMENT WILL ALTER THE LONG TERM AND SHORT TERM EFFECTS ON THE COVES. CONTAINMENT WILL HAVE THE GREATEST LONG TERM IMPACTS BY DECREASING THE USEFUL LINES OF THE COVES, AS WELL AS AFFECTING THE BENTHIC COMMUNITIES DIVERSITY AND ABUNDANCE. BECAUSE OF THE SUBSTRATE, THE BENTHIC COMMUNITIES MAY NEVER RECOVER BECAUSE OF TOTAL CONTAINMENT.

ROBERT L. PEARCE
SUPV HYDRAULIC ENGINEER
WATER CONTROL SECTION.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AUGUST 1, 1986

MR. JOEL SINGERMAN, ACTING CHIEF
WESTERN NEW YORK REMEDIAL ACTION SECTION
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

SUBJECT: DRAFT REMEDIAL INVESTIGATION REPORT
MARATHON BATTERY SITE

DEAR MR. SINGERMAN:

THE TWO-DAY COMMENT PERIOD FOR THE DRAFT REMEDIAL INVESTIGATION PERMITS ONLY THE MOST CURSORY REVIEW. WE MAY BE SUBMITTING FURTHER COMMENTS ON THE RI IN THE NEXT FEW DAYS BASED ON MORE EXTENSIVE REVIEW OF THE DOCUMENT.

THE RI (EXECUTIVE SUMMARY) AS IT STANDS BEGS OFF THE QUESTION OF DAMAGE TO NATURAL RESOURCES, ESPECIALLY IN CONSTITUTION MARSH AND THE HUDSON RIVER. WE ARE STILL CONCERNED ABOUT BIOASSAY RESULTS FROM CONSTITUTION MARSH SEDIMENTS (WORK NOT DONE BY KNEIP, INCIDENTLY, WHICH IS THE INCORRECT BUT OBVIOUS INFERENCE FROM PAGE 5, PARAGRAPH 2) AND ABOUT EFFECTS OF MARATHON BATTERY CONTAMINANTS ON HUDSON RIVER BIOTA. WE CANNOT TOTALLY ACCEPT THE THIRD REMEDIAL RESPONSE OBJECTIVE STATED ON PAGE 6. IF REMEDIAL ACTIVITIES IN FOUNDRY COVE DO NOT INDIRECTLY ACHIEVE THE RESULT OF LOWERED TOXICITY OF CONSTITUTION MARSH SEDIMENTS, THE QUESTION OF CONTAMINATION IN CONSTITUTION MARSH AND ITS EFFECTS ON BIOTA WILL BE RAISED AGAIN. IT SHOULD BE NOTED ALSO IN THE EXECUTIVE SUMMARY THAT EFFECTS OF THE SITE ON THE HUDSON RIVER ARE STILL TO BE STUDIED.

THE ASSESSMENT OF ENVIRONMENTAL CONCERNS BEGINNING ON PAGE 8-1 ERRONEOUSLY EXCLUDES CONSIDERATION OF BIRDS AND MAMMALS AS SECONDARY CONSUMERS. COMPARE WITH THE DESCRIPTION OF NATURAL RESOURCES ON PAGE 2-3 FOR AVIAN CONSUMERS WHICH SHOULD BE INCLUDED. ARE MINK AND RACCOONS EXAMPLES OF SECONDARY CONSUMERS THAT SHOULD BE INCLUDED? NOTE THAT ALL IMPORTANT PATHWAYS FOR CADMIUM MOVEMENT IN THE ENVIRONMENT DO NOT LEAD TO MAN AS SUGGESTED BY FIGURE 8-1. THERE IS AT LEAST POTENTIAL FOR EFFECTS ON OTHER SECONDARY CONSUMERS. THIS POTENTIAL SHOULD BE DISCUSSED IN SECTION 8.3.1.

THE THIRD SENTENCE OF PARAGRAPH 2 ON PAGE 8-39 IS CONFUSING. WHAT DOES "AND THROUGH THE FOOD CHAIN" MEAN, AND WHY IS IT EXCLUDED FROM THE EXECUTIVE SUMMARY SYNOPSIS (PAGE 5, LAST SENTENCE)? FOOD CHAIN EFFECTS ARE OF MAJOR IMPORTANCE HERE, BUT WHICH FOOD CHAIN?

PLEASE SUBSTITUTE THE WORDS "DISTURBANCE TO" FOR "DESTRUCTION OF" IN THE LAST SENTENCE ON PAGE 8-40. THIS MORE INCLUSIVE WORDING BETTER DESCRIBES OUR CONCERN.

WE ALSO NOTE THAT DETECTION LIMITS FOR THE METALS APPEAR HIGH. WE MAY BE GETTING BACK TO YOU WITH MORE DETAILS ON THIS OBSERVATION.

SINCERELY YOURS,

MARIE KAUTZ
SUPERVISING FISH AND WILDLIFE BIOLOGIST
BUREAU OF ENVIRONMENTAL PROTECTION
DIVISION OF FISH AND WILDLIFE

MK:MSK

CC: J. IANNOTTI
J. HICKEY
J. ROD.

NATIONAL AUDUBON SOCIETY

AUGUST 5, 1986

MR. JOEL SINGERMAN
ACTING CHIEF
WESTERN NEW YORK REMEDIAL ACTION SECTION
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, N.Y. 10278

SUBJECT: MARATHON BATTERY SITE
SUPPLEMENTAL
DRAFT REMEDIAL INVESTIGATION
REPORT AND
DRAFT FEASIBILITY STUDY REPORT

DEAR JOEL:

THE COMMENT PERIODS FOR BOTH THE DRAFT RI AND FS REPORTS WERE SIMPLY TOO SHORT FOR A CRITICAL REVIEW, SO MOST OF THE COMMENTS IN THIS LETTER WILL PERTAIN TO THE FEASIBILITY STUDY. I HAVE READ THE COMMENTS FROM NYS DEC SUBMITTED TO YOU ON AUGUST 1 BY MARIE KAUTZ AND AGREE WITH THEM AS THEY PERTAIN TO THE REMEDIAL INVESTIGATION REPORT.

COMMENTS ON DRAFT FEASIBILITY STUDY REPORT

PAGE 1-4: THE INTRODUCTION CORRECTLY IDENTIFIES THE OWNER OF CONSTITUTION MARSH AS THE TACONIC STATE PARK COMMISSION. LATER, ON PAGE 5-64, THE PALISADES INTERSTATE PARK COMMISSION IS INCORRECTLY IDENTIFIED AS TITLE HOLDER.

1-11: SCIENTIFIC NAME OF BLUE CLAW CRAB IS CALLINECTES SAPIDUS. FURTHER, THE HEALTH ADVISORY PERTAINING TO CRAB CONSUMPTION IS HUDSON RIVER-WIDE AND NOT LIMITED TO THE FOUNDRY COVE AREA.

1-12: WHILE IT IS TRUE THAT ONLY TRACE METAL CONCENTRATIONS WERE FOUND IN THE WATER COLUMN, IT IS ALSO TRUE THAT BIOACCUMULATION STUDIES PERFORMED BY ACRES INTERNATIONAL ON FUNDULUS AND CRAYFISH SHOWED RAPID AND UNEXPECTED BIOACCUMULATION OF CADMIUM. FURTHER WORK SHOULD BE DONE IN THIS AREA. SIMPLY PREVENTING BIOTA FROM CONTACTING SEDIMENT MAY NOT PROVIDE SUFFICIENT PROTECTION.

1-17: NOT ALL DOCUMENTS CITED IN THE BIBLIOGRAPHY WERE USED IN THE PREPARATION OF THIS REPORT, FOR AT LEAST ONE DOES NOT EXIST. IN FACT, THE ENTIRE BIBLIOGRAPHY WAS MISSING FROM MY COPY. THE BIBLIOGRAPHY PROVIDED FOR THE RI REPORT (PAGE BB-4) CITES A NON-EXISTENT PAPER BY FRICKSON AND LINDZEY, A TYPOGRAPHICAL ERROR COPIED FROM THE ACRES INTERNATIONAL REPORT. THE CORRECT CITATION IS ERICKSON. PRESUMABLY OTHER REFERENCES WERE SIMPLY COPIED FROM ACRES AND NOT ACTUALLY CONSULTED.

IN ADDITION, THE FS CONTAINS NUMEROUS TYPOGRAPHICAL ERRORS, IN ADDITION TO THE BLUE CLAW CRAB NOTED ABOVE, SUCH AS FOUNDRY COVE; KIMBLE AND KIMBALL AVENUE FOR KEMBLE AVENUE IN SEVERAL PLACES, ETC. I WILL NOT BOTHER TO CITE ALL OF THEM FOR I UNDERSTAND THAT THIS DOCUMENT WAS PREPARED ON AN ACCELERATED SCHEDULE WHICH PROBABLY LEFT LITTLE TIME FOR PROOFREADING.

4-2: THE "NO ACTION" ALTERNATIVE FOR ECM IS UNACCEPTABLE FOR MANY REASONS, PRIMARILY BECAUSE IT WILL NOT REMOVE THE CONTAMINANTS. IN ADDITION, THE SILT CURTAIN WOULD NOT BE "PERMANENT," FOR IT WILL BE CONTINUALLY DAMAGED BY FLOATING DEBRIS BROUGHT IN ON TIDES, INCLUDING SUCH THINGS AS FULL-SIZED TREES. FURTHER, WINTER ICE WILL NOT ONLY DESTROY THE CURTAIN BUT WILL ALSO REMOVE MOST OR ALL OF THE SUPPORTING PIPES EACH YEAR, NECESSITATING REPLACEMENT OF THE ENTIRE SYSTEM. A FENCE WOULD SOON BE BREACHED AND SIGNS WOULD BE QUICKLY VANDALIZED. ALL OF THE LARGE METAL SIGNS ERECTED BY ACRES ARE NOW MISSING OR ILLEGIBLE.

4-3: TO CONTINUE THE DISCUSSION OF "NO ACTION" FOR ECM, EXACTLY WHO WOULD BE RESPONSIBLE FOR THE LONG-TERM (30 YEAR) MONITORING OF SEDIMENTS AND WATERS, MAINTENANCE AND INSPECTIONS?

THE QUESTION IN THE PRECEDING PARAGRAPH APPLIES TO ALL ALTERNATIVES SUGGESTED FOR ALL THREE SUB-AREAS. WOULD SAMPLING AND TESTING BE DONE BY DEC? BY EPA? BY A CONTRACTOR HIRED BY EPA? WOULD THE FIRM RESPONSIBLE BE HIRED ON A LONG-TERM, 30-YEAR BASIS WITH A CONTRACT GUARANTEEING PAYMENT FOR THAT PERIOD, OR WOULD ANNUAL PAYMENTS BE AUTHORIZED EACH YEAR BY EPA? WHO WOULD MONITOR THE LONG-TERM MONITORS? LOCAL RESIDENTS ARE CONCERNED, AS POINTED OUT IN THE INTRODUCTION, THAT THE ORIGINAL BURIAL VAULT HAS GONE UN-MONITORED FOR MORE THAN A DECADE ON THE MARATHON PLANT SITE AND I AM SURE THAT THE ENVIRONMENTAL GROUPS MENTIONED IN THE INTRODUCTION WOULD WANT SOLID ASSURANCES THIS TIME THAT MONITORING WILL OCCUR AS PROMISED.

4-6: BEFORE THE "HARVESTED" CATTAILS AND OTHER AQUATIC PLANTS ARE TRUCKED IN STANDARD GARBAGE TRUCKS TO A LOCAL MUNICIPAL LANDFILL, SHOULD THEY NOT BE ANALYZED FOR HEAVY METAL CONTAMINATION IN ORDER TO DETERMINE WHETHER OR NOT THEY ARE NON-HAZARDOUS? THEY ARE KNOWN TO HAVE ELEVATED CADMIUM LEVELS. ARE THESE LEVELS A THREAT?

4-8: "THE SEDIMENT AND DRY REAGENT WILL BE THOROUGHLY BLENDED IN A HIGH POWERED MILL OF SPECIAL DESIGN.". DOES THIS "SPECIAL DESIGN" MILL EXIST OR MUST IT BE SPECIALLY DESIGNED FOR THE FOUNDRY COVE CLEANUP?

THE FACT THAT THESE MATERIALS HAVE PASSED THE EP TOXICITY TEST DOES NOT, IN MY OPINION (SHARED BY OTHERS) NECESSARILY MEAN THAT THEY ARE ENVIRONMENTALLY "SAFE.". FOR HOW LONG WILL THEY REMAIN NON-HAZARDOUS? 20 YEARS? 100 YEARS? FOREVER? DOES ANYONE KNOW? UNLESS THEY ARE KNOWN TO BE FOREVER SAFE, I BELIEVE IT IS UNWISE TO ALLOW THEIR USE AS MUNICIPAL LANDFILL COVER, AND THAT THEY SHOULD BE DISPOSED OF IN A LANDFILL SUCH AS THE ONE AT MODEL CITY, N.Y. AS THOUGH THEY WERE HAZARDOUS. IF THE MATERIALS ARE ACTUALLY NON-HAZARDOUS, WHY MUST THE TRUCKS TRANSPORTING THEM BE LINED, SEALED AND DE-CONTAMINATED?

4-9: ASSUMING THE ARMY COE DREDGING OF HAVERSTRAW BAY PROCEEDS ON SCHEDULE, HOW "CLEAN" ARE THE SEDIMENTS PROPOSED TO BE USED FROM THAT DREDGING AS FILL IN FOUNDRY COVE? IT SHOULD BE REMEMBERED THAT BLUE CLAW CRABS FROM THE VICINITY OF HAVERSTRAW BAY AND CROTON POINT ALSO HAVE ELEVATED CADMIUM LEVELS.

4-10: MARSH REVEGETATION

THIS IS AN IMPORTANT AND COMPLEX SUBJECT AND REQUIRES MUCH MORE DETAILED TREATMENT THAN IS PROVIDED IN THE DRAFT FS. THERE IS, I BELIEVE, AGREEMENT AMONG ALL PARTIES THAT THE FOUNDRY COVE MARSH MUST BE RESTORED. TIDAL MARSHES ARE AMONG THE MOST PRODUCTIVE OF ALL ECOSYSTEM TYPES AND THE HUDSON RIVER HAS ALREADY LOST MORE OF ITS MARSHES THAN IT CAN AFFORD. INDEED, THE VERY EXISTENCE OF THE FOUNDRY COVE MARSH -- FULFILLING ONE OF ITS MANY ROLES IN THE ENVIRONMENT, THAT OF SEDIMENT TRAP -- HAS PREVENTED THE WIDE-SPREAD DISPERSAL OF HEAVY METALS OVER THE PAST THREE DECADES.

I AGREE THAT GREATER MARSH DIVERSITY WOULD BE DESIRABLE BUT DO NOT AGREE THAT THE REPLANTING BE CONFINED SOLELY TO CATTAIL AND ARROW ARUM. WHILE THERE ARE RELATIVELY FEW SPECIES TOLERANT OF SALINITY AND FLOODING REGIMES, THERE ARE OTHER SPECIES CURRENTLY PRESENT IN THE FOUNDRY COVE MARSH WHICH SHOULD ALSO BE REPLANTED. THESE INCLUDE PICKERELWEED, ARROWHEAD, BUR-REED AND SEVERAL OTHERS. BEFORE THE PRESENT MARSH IS REMOVED, A VEGETATION SURVEY SHOULD BE UNDERTAKEN TO DETERMINE WHICH SPECIES ARE PRESENT AND IN WHAT RATIOS IN ORDER TO DEVELOP A REPLANTING PLAN WHICH WILL RESULT IN A SIMILAR MARSH.

THE ORIGINAL MARSH ELEVATION SHOULD BE CAREFULLY SURVEYED (POSSIBLY AFTER "HARVEST" OF CATTAIL TOPS TO ALLOW EASIER LINE-OF-SIGHT) AND RESTORED TO THAT ELEVATION TO LIMIT INVASION BY PHRAGMITES AND PURPLE LOOSESTRIFE. WHILE MENTION IS MADE OF FERTILIZATION OF THE REPLANTED MARSH, NO MENTION IS MADE OF METHODS TO CONTROL PHRAGMITES AND PURPLE LOOSESTRIFE WHILE THE MARSH PLANTING IS BECOMING ESTABLISHED. AT OUR RECENT MEETING IN YOUR OFFICE, IT WAS SUGGESTED THAT INDIVIDUAL PLANTS MIGHT BE CONTROLLED BY APPLICATION OF A HERBICIDE BY A MAN WITH A BACKPACK SPRAYER. I DO NOT FAVOR THIS METHOD BECAUSE OF THE POTENTIAL EFFECTS OF THE HERBICIDE ON OTHER PLANTS, AND THE SUBSEQUENT WASHING-OFF OF THE HERBICIDE INTO THE WATER COLUMN BY THE TWICE-DAILY TIDES.

INSTEAD, I SUGGEST THAT INVADING PLANTS BE CONTROLLED BY HAND-PULLING, A TECHNIQUE USED SUCCESSFULLY ELSEWHERE. IT REQUIRES NO MORE LABOR, AS A MAN WOULD HAVE TO VISIT EACH PLANT ANYWAY USING EITHER METHOD.

FURTHER, I DO NOT BELIEVE A 2-FOOT BY 2-FOOT PLANTING GRID IS SUFFICIENTLY DENSE AND RECOMMEND AT LEAST A 1-FOOT BY 1-FOOT GRID. THE MORE QUICKLY A DENSE MARSH IS RESTORED, THE FEWER PROBLEMS WILL BE ENCOUNTERED WITH INVADING WEEDS.

LATER IN THE FS DOCUMENT CONSTITUTION MARSH IS SUGGESTED AS A POSSIBLE NEARBY SOURCE OF SEEDS, TUBERS AND/OR PLANTS FOR THE FOUNDRY COVE MARSH RESTORATION. IF THE MARSH CONTINUES TO BE CONSIDERED A NURSERY STOCK SOURCE, I WILL WANT TO SEE DETAILED STUDIES REGARDING WHERE AND HOW, AND HOW MANY PLANTS WILL BE REMOVED IN ORDER TO AVOID DISTURBANCES IN CONSTITUTION MARSH WHICH MIGHT RESULT IN PHRAGMITES INVASION (AT PRESENT, IT DOES NOT OCCUR IN CONSTITUTION MARSH) OR IN AN INCREASE IN PURPLE LOOSESTRIFE.

FINALLY, WHAT ABOUT TIDE CHANNELS IN THE RESTORED MARSH IN FOUNDRY COVE? WILL THEY BE REPLACED AND RE-PLANTED WITH APPROPRIATE SUBMERGED AQUATIC PLANTS? AND, I RECOMMEND THAT THE POTENTIAL PROBLEM OF ICE-SCOURING BE ADDRESSED. WILL SUCH SCOURING DESTROY ALL OR PART OF THE RE-PLANTED MARSH BEFORE IT CAN GET ESTABLISHED? I BELIEVE THAT THE MOST SUCCESSFUL RE-ESTABLISHED MARSHES ARE FARTHER SOUTH ON THE COAST WHERE ICE DAMAGE MAY NOT HAVE BEEN A PROBLEM.

4-12: RESTORATION WILL TAKE "QUITE SOME TIME" AND THE MARSH WILL "EVENTUALLY BE RESTORED TO ITS PRESENT CONDITION.". THAT TIME FRAME IS BEING CONSIDERED FOR COMPLETE "RESTORATION?". AND, AGAIN, WHO WILL PAY FOR THE MONITORING AND WHO WILL CONDUCT THE MONITORING, PLANTING AND WEED CONTROL?

4-13: I AM OPPOSED TO THE CONSTRUCTION OF AN ON-SITE HAZARDOUS OR NON-HAZARDOUS WASTE DISPOSAL LANDFILL AND I AM CONVINCED THAT THERE WOULD BE CONSIDERABLE COMMUNITY OPPOSITION TO SUCH A LANDFILL. I BELIEVE THAT ALL CONTAMINATED MATERIALS – INCLUDING THOSE PARTS OF THE BATTERY FACTORY BUILDINGS AND GROUNDS WHICH MAY PROVE TO BE CONTAMINATED AND THE PRESENT BURIAL VAULT -- SHOULD BE ENTIRELY REMOVED FROM THE SITE. AS NOTED EARLIER IN THE FS DOCUMENT, CONSTRUCTION OF A SEVERAL-ACRE, TWENTY-FEET PLUS TALL LANDFILL WILL ALMOST CERTAINLY NOT ENHANCE LOCAL PROPERTY VALUES AND WILL DO LITTLE TO RELIEVE THE MINDS OF ADJACENT RESIDENTS ON CONSTITUTION DRIVE, EVEN IF THERE IS NO CONTINUING OR FUTURE ENVIRONMENTAL THREAT WHICH I DO NOT BELIEVE CAN BE GUARANTEED.

UNLESS MTA POLICY HAS RECENTLY CHANGED, FREIGHT TRAFFIC IS ALLOWED ON THE ADJACENT MTA TRACKS. WHILE CONDUCTING LATE-NIGHT RESEARCH IN CONSTITUTION MARSH, DURING THE HOURS WHEN COMMUTER TRAINS DO NOT RUN, I HAVE SEVERAL TIMES SEEN LONG FREIGHT TRAINS ON THESE TRACKS.

IT MIGHT BE FEASIBLE TO BUILD A RAILROAD SPUR FROM THE PRESENT TRACKS ALONG THE NORTH END OF FOUNDRY COVE ON THE EXISTING OVER-GROWN RIGHT-OF-WAY (WHICH WAS AT ONE TIME IN THE PAST ONCE A RAIL SPUR) AND TO LOAD FREIGHT CARS WITH DREDGED MATERIALS WHICH COULD BE ATTACHED TO FREIGHT TRAINS AT NIGHT. IF RAIL ACCESS IS NOT POSSIBLE ALL THE WAY TO MODEL CITY, THE MATERIALS COULD BE OFF-LOADED INTO TRUCKS AT SOME MORE CONVENIENT POINT FARTHER NORTH, OR THE MATERIALS COULD BE LOADED INTO TRUCK BODIES ON FLAT CARS AND WHICH WOULD ELIMINATE DOUBLE HANDLING.

IF, IN FACT, RAIL TRANSPORT IS NOT FEASIBLE, IT MAY BE POSSIBLE TO ROUTE LOADED TRUCKS ALONG THE RAILROAD ACCESS ROAD WHICH PARALLELS THE MTA TRACKS FROM FOUNDRY COVE TO THE PRESENT EXIT NEAR THE COLD SPRING SEWAGE TREATMENT PLANT AND ONTO RIVER ROAD WHICH CONNECTS DIRECTLY WITH RT. 9D NORTH OF COLD SPRING ABOUT ONE-HALF MILE. THIS WOULD ELIMINATE THE DANGEROUS AND HIGHLY INCONVENIENT TRUCK TRAFFIC THROUGH THE NARROW STREETS OF THE VILLAGE OF COLD SPRING WHICH IS A MAJOR CONCERN EXPRESSED SEVERAL TIMES IN THE FS DOCUMENT.

5-13: CONTAINMENT IS NOT AN ACCEPTABLE ALTERNATIVE FOR ECM FOR MANY REASONS. FIRST, CONTAINMENT DOES NOT REMOVE THE ENVIRONMENTAL THREAT. SECOND, "THERE IS NO KNOWN APPLICATION OF THIS TYPE OF CAP IN SIMILAR SITE CONDITIONS" AND IT IS "ANTICIPATED THAT THE USEFUL LIFE OF THE CAP WOULD BE 20 YEARS.". THE OBVIOUS QUESTION IS THEN WHAT HAPPENS? EVEN IF THE CAP WORKED AS HOPED FOR THE FULL 20 YEARS, WE WOULD THEN BE FACED WITH THE SAME PROBLEM WE HAVE NOW. IT WOULD BE FISCALLY IRRESPONSIBLE TO SPEND THESE MILLIONS OF DOLLARS ON AN UNPROVEN TECHNOLOGY WITH AN UNKNOWN, BUT ADMITTEDLY TEMPORARY, EFFECTIVENESS. IT WOULD ALSO BE ENVIRONMENTALLY IRRESPONSIBLE.

5-16: CONTAINMENT IS NOT AN ACCEPTABLE ALTERNATIVE FOR EC FOR THE SAME REASONS. IN ADDITION, THE EC CAP IS ESTIMATED TO LAST FOR ONLY TEN YEARS AND AGAIN "DEMONSTRATED PERFORMANCE OF THE CAP SUCH AS THIS IS UNPROVEN IN THE FIELD AND IT HAS NOT BEEN TESTED IN THE LABORATORY.".

"NO ACTION" IS NOT ACCEPTABLE FOR EITHER EC OR FOR ECM BECAUSE THE ENVIRONMENTAL THREAT IS NOT REMOVED. CONTAINMENT IS NOT ACCEPTABLE AT EITHER SITE FOR THE REASONS STATED ABOVE, AND SHOULD NOT EVEN BE CONSIDERED IN THE FINAL REPORT. AS I UNDERSTAND THE LAW, LEGALLY "NO ACTION" MUST REMAIN AS AN ALTERNATIVE, BUT SHOULD NOT BE SERIOUSLY CONSIDERED.

AN ON-SITE LANDFILL IS NOT ACCEPTABLE FOR REASONS GIVEN ABOVE.

5-18: CONSTITUTION MARSH

ALTERNATIVE CM-1: NO ACTION IS THE PREFERRED ALTERNATIVE FOR CONSTITUTION MARSH. DREDGING OF SUBSTANTIAL AREAS OF CONSTITUTION MARSH WOULD PERMANENTLY ALTER AND DEGRADE THE ECOSYSTEM. THE DREDGED AREAS WOULD LIKELY NEVER RECOVER THE CURRENT PRODUCTIVITY AND THE IMPACTS MIGHT SUBSTANTIALLY AFFECT THE REMAINDER OF THE MARSH AS WELL LEADING TO SEVERE AND IRREVERSIBLE EFFECTS ON THE ENTIRE 270 ACRES.

WHILE NO WORDING IS SUGGESTED IN THE DRAFT FS FOR THE WARNING SIGNS, THAT CAN BE DECIDED UPON LATER. IT SHOULD BE POINTED OUT THAT THE MARSH BOUNDARIES ARE NOW, AND HAVE BEEN FOR 16 YEARS, POSTED. BECAUSE CONSTITUTION MARSH IS A WILDLIFE SANCTUARY MANAGED BY NATIONAL AUDUBON SOCIETY, NO HUNTING, FISHING, CRABBING OR TRAPPING IS ALLOWED. THESE SIGNS, COUPLED WITH THE REGULAR PATROLS OF THE RESIDENT MANAGER, HAVE BEEN VERY EFFECTIVE. THEREFORE, THERE IS VIRTUALLY NO HUMAN CONSUMPTION OF BIOTA FROM CONSTITUTION MARSH.

IN ADDITION, VIRTUALLY ALL PUBLIC ACCESS IS BY CANOE WHICH PREVENTS PUBLIC CONTACT WITH CONTAMINATED SEDIMENTS. ALMOST NO ONE CARES TO ATTEMPT FOOT TRAVEL THROUGH THE THICK VEGETATION IN CONSTITUTION MARSH WHICH MEANS THAT THE LEVEL OF REMEDIATION WILL BE MODERATE TO HIGH SINCE THERE IS CURRENTLY VIRTUALLY NO PUBLIC EXPOSURE TO CONTAMINATION AND APPROPRIATE SIGNS SHOULD HELP TO VIRTUALLY ELIMINATE ANY PUBLIC CONTACT WITH THE VEGETATION OR SEDIMENTS.

5-28: THIS SECTION ON PREDICTED ENVIRONMENTAL IMPACTS FOR THE VARIOUS REMEDIAL ALTERNATIVES IS GENERALLY GOOD AND, IN FACT, SERVES TO UNDERSCORE THE SEVERAL REASONS WHY NO ACTION, CONTAINMENT AND ON-SITE LANDFILL ALTERNATIVES SHOULD BE REJECTED. THERE ARE INSUFFICIENT DATA TO PREDICT FUTURE GROUNDWATER IMPACTS; FUTURE NEARBY DEVELOPMENTS REQUIRING WATER WELLS ARE UNKNOWN; THE LONG-TERM LIFE OF AN ON-SITE LANDFILL IS UNKNOWN; CONTAINMENT CAPS ARE ONLY TEMPORARY AND RESULTING HYDROLOGY, CHANGES MAY ADVERSELY IMPACT THE CONSTITUTION MARSH ECOSYSTEM.

5-38: CONSTITUTION MARSH ENVIRONMENTAL IMPACTS

I AGREE THAT A THOROUGH CLEANUP OF FOUNDRY COVE SHOULD RESULT IN A GRADUAL REDUCTION OF CONTAMINANT PROBLEMS IN CONSTITUTION MARSH. I ALSO AGREE THAT LONG TERM MONITORING (30 YEARS) AS OUTLINED IS ESSENTIAL FOR THE NO ACTION ALTERNATIVE IN ORDER TO QUANTIFY THE EFFECTS OF FOUNDRY COVE CLEANUP. ALONG THOSE LINES I HAVE AN IMPORTANT SUGGESTION TO MAKE WHICH WILL REQUIRE FAIRLY IMMEDIATE ACTION. I BELIEVE THAT THE EXISTING WOODEN STAKES WHICH MARK THE EBASCO SAMPLING SITES IN CONSTITUTION MARSH SHOULD BE REPLACED WITH HEAVY, RUSTPROOF STAINLESS STEEL OR ALUMINUM PIPES DRIVEN WELL DOWN INTO THE MARSH SEDIMENTS IN ORDER TO PERMANENTLY MARK THESE SAMPLING LOCATIONS FOR FOLLOW-UP FUTURE VISITS. IF THIS IS NOT DONE BEFORE WINTER, ICE WILL REMOVE THE PRESENT WOODEN STAKES MAKING THE ORIGINAL SAMPLING SITES DIFFICULT OR IMPOSSIBLE TO RELOCATE. ESPECIALLY SINCE THE "HOT SPOTS" FOUND IN CONSTITUTION MARSH MAY SIMPLY BE AN ARTIFACT OF THE SAMPLING DESIGN, I BELIEVE IT IS IMPORTANT TO TAKE FUTURE SAMPLES AT EXACTLY THE SAME PLACES IN ORDER TO HAVE MEANINGFUL COMPARATIVE DATA. THESE PERMANENT STAKES SHOULD BE PLACED WHERE THE PRESENT WOODEN STAKES ARE LOCATED ON EITHER SIDE OF THE CHANNELS BUT NOT IN THE CHANNELS THEMSELVES. MID-CHANNEL ORIGINAL SAMPLING LOCATIONS CAN EASILY BE MEASURED OUT FROM THE STAKES IN THE VEGETATION ON EITHER SIDE.

5-40: I AGREE ENTIRELY WITH THE STATEMENT THAT ... "CONSTITUTION MARSH IS AN IMPORTANT RESOURCE, AND ANY POTENTIAL LOSS OF IT WOULD BE VERY DIFFICULT TO JUSTIFY.".

5-87: TABLE 5-9 (CONT'D): UNDER CM-1 NO ACTION (AND FOR SEVERAL OTHER ALTERNATIVES AS WELL) THE O&M COST IS LISTED FOR (1-30 YR.). DOES THIS MEAN THAT MONITORING MAY OCCUR FOR ONLY ONE YEAR, FOR 30 YEARS, OR FOR SOME SO FAR UNDETERMINED PERIOD IN BETWEEN? THE TEXT APPEARS TO SUGGEST 30-YEAR MONITORING WHICH I BELIEVE IS NECESSARY.

GENERAL COMMENT: I BELIEVE THAT DREDGING IN EAST FOUNDRY COVE AND EAST FOUNDRY COVE MARSH SHOULD REMOVE SEDIMENTS TO THE 10 MG/KG (TEN PPM) LEVEL AND NOT TO THE 100 MG/KG LEVEL. I BELIEVE THE 10 PPM LEVEL IS ACHIEVABLE WITHOUT PROHIBITIVELY INCREASING THE COST AND WOULD RESULT IN SUBSTANTIALLY REDUCED HEALTH AND ENVIRONMENTAL THREATS AS WELL AS SUBSTANTIALLY SPEED UP THE RECOVERY OF CONSTITUTION MARSH.

SUMMARY OF COMMENTS:

I FAVOR THE FOLLOWING REMEDIAL ALTERNATIVES:

ECM - 2   CLEANUP TO 10 PPM
EC - 2   CLEANUP TO 10 PPM
CM - 1.

I ALSO FAVOR A PUBLIC MEETING AND A RELEASE TO LOCAL NEWSPAPERS OF THE CURRENT STATUS OF THE STUDY. THE PUBLIC HAS HAD NO INFORMATION ON THIS PROJECT FOR MANY MONTHS AND DESERVES TO BE KEPT INFORMED.

THANK YOU FOR THE OPPORTUNITY TO COMMENT ON THE SUPPLEMENTAL DRAFT RI AND FS STUDY REPORTS. WE LOOK FORWARD TO PROVIDING ADDITIONAL COMMENTS AS THE STUDY PROGRESSES.

SINCERELY,

JAMES P. ROD
MANAGER
CONSTITUTION MARSH SANCTUARY
NATIONAL AUDUBON SOCIETY.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AUGUST 6, 1986

MR. JOEL SINGERMAN
WESTERN NEW YORK REMEDIAL ACTION SECTION
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR JOEL:

WE ARE ESSENTIALLY IN AGREEMENT THAT EXCAVATION ACTIVITIES IN CONSTITUTION MARSH WOULD POSSIBLY DO MORE HARM THAN GOOD. IF ONE CONSIDERS EAST FOUNDRY COVE AND THE ASSOCIATED MARSH AS THE "SOURCE" OF CONTAMINATION TO CONSTITUTION MARSH, THEN REMOVAL OF THIS INFLUENCE AND SUBSEQUENT MONITORING OF THE EFFECTS ON CONSTITUTION MARSH ARE IN ORDER. HOWEVER, ON-SITE DISPOSAL AS PROPOSED IN ECM-3 AND EC-3 IS NOT A PREFERRED ALTERNATIVE EVEN THOUGH THE CONTAMINATED SPOILS ARE "FIXED.". THIS MATERIAL WOULD STILL REMAIN IN AN ENVIRONMENTALLY SENSITIVE ZONE, POTENTIALLY SUBJECT TO ANY NUMBER OF PERTURBATIONS. WHAT EVIDENCE IS THERE TO SAY IT IS NOT OR WILL NOT BECOME BIOLOGICALLY AVAILABLE?

CLASSIFICATION AS A "NON-HAZARDOUS" WASTE BASED ON AN EP TOXICITY TEST, AS INDICATED ON PAGE 2-32, IS NOT ACCEPTABLE AS PROOF OF INNOCUOUSNESS. FOR EXAMPLE, IN THE DISCUSSION OF "CAPPING" ON PAGE 2-16, THERE IS AN IMPLIED DIFFERENTIAL OF BIOAVAILABILITY BASED ON PHYSICAL PARTITIONING, BUT WITHOUT TESTING THE BIOLOGICAL CONSEQUENCES SUCH TREATMENT ALTERNATIVES INCLUDING "FIXATION" ARE STILL MOOT. REMEMBER CADMIUM WAS NOT "DETECTED" IN THE WATER COLUMN DURING THE BIOACCUMULATION TESTS ON CRAYFISH AND KILLIFISH EITHER, BUT IN JUDGING THE RESULTS THE CONTAMINATION WAS CERTAINLY IN EVIDENCE.

THEREFORE, WE WANT THE SOURCE REMOVED FROM FOUNDRY COVE DOWN TO 10 PARTS PER MILLION (ORIGINALLY PROPOSED BY ACRES) AND THEREBY ALLEVIATE CONCERNS ASSOCIATED WITH ANY POTENTIAL CONTINUING OR FUTURE INPUTS TO CONSTITUTION MARSH ORIGINATING FROM FOUNDRY COVE. WE CAN MORE READILY SUPPORT THE CONCEPTS OF EC-2 AND ECM-2. IN ADDITION, THE INCREASED COST OF OFF-SITE DISPOSAL IS A SMALL PRICE TO PAY GIVEN THE PUBLIC SENTIMENTS EXPRESSED OVER FEELINGS OF "BEING ABANDONED.". ONCE FIXATED, THE MATERIAL COULD BE TRANSPORTED. EVEN THOUGH THE SHORT-TERM CONSEQUENCES OF TRUCKING ON VILLAGE STREETS ARE NOT DESIRABLE, DOING SO BETTER PROVIDES FOR A LONG-TERM SOLUTION. HENCE, THE CONCEPT OF PRO BONO PUBLICO IS ENHANCED AND THE PROJECT SHOULD RECEIVE MORE WIDESPREAD SUPPORT.

ONE SPECIFIC COMMENT ON PAGE 1-11 RELATES TO THE BLUE CRAB HEALTH ADVISORY. THE COMMENTS ARE ERRONEOUS SINCE THE COLLECTIONS OF CRAB TAKEN AT SEVERAL HUDSON RIVER LOCATIONS WERE ALL HIGH IN CADMIUM CONCENTRATIONS (SEE SLOAN AND KARCHER AND THE ACRES RI). HENCE, THE ADVISORY IS A GENERAL ONE FOR THE HUDSON RIVER NOT JUST FOUNDRY COVE. OTHER SECTIONS AND PARAGRAPHS ALSO CONTAIN INTERPRETIVE ERRORS BUT THIS ONE WILL SERVE AS AN EXAMPLE FOR NOW.

BIOASSAYS AS PART OF THE FUTURE MONITORING IN CONSTITUTION MARSH ARE CERTAINLY IN ORDER AND WE EXPECT FOR THE RECORD TO BE INTIMATELY INVOLVED WITH THE PLANNING FOR LONG-TERM EVALUATIONS OF REMEDIATION SUCCESSES (OR FAILURES) INCLUDING EFFECTS ON BOTH FOUNDRY COVE AND CONSTITUTION MARSH CONCENTRATIONS.

DURING THE 30-DAY COMMENT PERIOD, WE WILL BE FORMULATING AND EXPRESSING MORE FULLY ON THOUGHTS ON BOTH THE RI AND FS.

SINCERELY,
RONALD SLOAN, PH.D.
SENIOR SCIENTIST
MARIE KAUTZ
SUPERVISING FISH & WILDLIFE BIOLOGIST
CC: J. IANNOTTI
J. HICKEY
J. HANLON
J. ROD.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

AUGUST 7, 1986

MR. JOEL SINGERMAN
REMEDIAL PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR MR. SINGERMAN:

THIS IS IN RESPONSE TO YOUR LETTER OF JULY 28, 1986, REQUESTING OUR REVIEW AND COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION (RI) AND FEASIBILITY STUDY (FS) REPORTS BY AUGUST 6, 1986, FOR THE MARATHON BATTERY COMPANY SITE, VILLAGE OF COLD SPRING, PUTNAM COUNTY, NEW YORK. THE FOLLOWING COMMENTS ARE INTENDED AS TECHNICAL ASSISTANCE ONLY AND DO NOT CONSTITUTE THE REPORT OF THE SECRETARY OF THE INTERIOR WITHIN THE MEANING OF SECTION 2(B) OF THE FISH AND WILDLIFE COORDINATION ACT (48 STAT. 401, AS AMENDED; 16 U.S.C. 661 ET SEQ.), NOR DO THEY PRECLUDE SEPARATE AND/OR ADDITIONAL COMMENTS ON ANY DEPARTMENT OF THE ARMY PERMITS THAT MAY BE REQUIRED UNDER SECTION 10 OF THE RIVER AND HARBORS ACT OF 1899 AND/OR SECTION 404 OF THE FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972.

WE COMMEND YOU ON YOUR DETERMINATION FOR GETTING A RECORD OF DECISION (ROD) PREPARED FOR THE REGIONAL ADMINISTRATOR'S SIGNATURE THIS FISCAL YEAR TO CLEAN UP THIS SITE. WE, HOWEVER, NEEDED MORE TIME TO ADEQUATELY REVIEW THE RI/FS REPORTS AND, THEREFORE, ADDITIONAL COMMENTS MAY BE FORTHCOMING AS WE REVIEW THE FINAL RI/FS REPORTS.

REMEDIAL INVESTIGATION REPORT (RI)

SECTION 2.3 - NATURAL RESOURCES. IT SHOULD BE NOTED THAT THE STRIPED BASS IS A SPECIES OF PARTICULAR CONCERN TO THE U.S. FISH AND WILDLIFE SERVICE. IN ADDITION, THE ATLANTIC TOMCOD, MICROGADUS TOMCOD, IS DESIGNATED AS A THREATENED SPECIES BY THE STATE OF NEW JERSEY. IT IS ALSO AN IMPORTANT SPORT AND FORAGE FISH. SINCE IT IS A DEMERSAL FISH, IT WOULD BIOACCUMULATE CONTAMINANTS AND PASS THEM UP THE FOOD CHAIN. ALSO, THE FEDERALLY ENDANGERED SHORTNOSE STURGEON, ACIPENSER BREVIROSTRUM, IS FOUND IN THE PROJECT AREA, MAINLY IN THE HUDSON RIVER. THIS SPECIES WOULD ALSO BE ESPECIALLY VULNERABLE TO CONTAMINATED SEDIMENTS AS IT FEEDS ON BOTTOM INVERTEBRATES.

SECTION 3.2.3 - BIOACCUMULATION IN AQUATIC ANIMALS. THIS SECTION IS INDICATIVE OF THE LACK OF INFORMATION REGARDING THE BIOACCUMULATION OF CADMIUM, NICKEL, AND COBALT IN THE LIVING RESOURCES OF THE PROJECT AREA AND THEIR EFFECTS ON THESE ANIMALS. THE CONCLUSION OF THE LAST PARAGRAPH (PAGE 3-14) MAY BE DUE TO THE LACK OF INVESTIGATIVE STUDIES AND GOOD CONTROLS.

SECTION 6.1.1 - DESCRIPTION OF ECOSYSTEM. TABLE 6.1 IS NOT INCLUDED. THE AMERICAN BLACK DUCK, ANAS RUBRIPES, IS A SPECIES OF PARTICULAR CONCERN TO THE U.S. FISH AND WILDLIFE SERVICE AND DEMANDS SPECIAL ATTENTION.

SECTION 6.1.2 - RARE SPECIES. THIS SECTION SHOULD INCLUDE THE FEDERALLY ENDANGERED SHORTNOSE STURGEON AS IT USES THE AREA JUST OUTSIDE EAST FOUNDRY COVE AND COULD BE AFFECTED BY WEST FOUNDRY COVE CONTAMINANTS.

SECTION 6.1.4 - CONTAMINANT ANALYSIS AND EXISTING STRESSES. A SHORTCOMING HERE IS THAT NO AMPHIBIAN OR REPTILES WERE ANALYZED FOR CONTAMINANTS. THE SNAPPING TURTLE SEEMS TO BE A GOOD ORGANISM FOR TESTING SINCE IT TENDS TO BIOACCUMULATE CONTAMINANTS AND SPENDS MOST OF ITS TIME IN CONTACT WITH THE BOTTOM SEDIMENTS.

SECTION 6.2.1 - DESCRIPTION OF ECOSYSTEM. THIS SECTION FAILS TO DESCRIBE THE HUDSON RIVER ECOSYSTEM. INSTEAD, IT DISCUSSES EAST FOUNDRY COVE. THE HUDSON RIVER CONSTITUTES AN IMPORTANT DISTRIBUTION SYSTEM OR PATHWAY FOR BIOTA AND CONTAMINANTS. THE HUDSON RIVER NEEDS TO BE DISCUSSED WITH THIS IN MIND AS IT RELATES

TO EAST FOUNDRY COVE AND MARSH AND CONSTITUTION MARSH.

SECTION 6.2.4 - CONTAMINANT ANALYSIS AND EXISTING STRESSES. THIS SECTION, ONCE AGAIN, CONCENTRATES ON EAST FOUNDRY COVE AND CONSTITUTION MARSH INSTEAD OF THE HUDSON RIVER.

SECTION 8.3.2 - AQUATIC COMMUNITIES. THE INFERENCE MADE BY THE LAST TWO SENTENCES OF THIS SECTION (PAGE 8-39) IS THAT NO ECOLOGICAL, PHYSIOLOGICAL, OR TOXICOLOGICAL IMPACTS OCCUR WHERE HIGH CONCENTRATIONS OF METALS EXIST BECAUSE THEY ARE BOUND UP AND STORED AWAY IN SOME REMOTE PART OF THE BODY. HOWEVER, MUCH ENERGY IS EXPENDED TO STORE THESE METALS WHICH UNDER "CLEANER" ENVIRONMENTS WOULD BE USED MORE PRODUCTIVELY.

FEASIBILITY STUDY REPORT (FS)

THE FEASIBILITY STUDY REPORT (FS) IDENTIFIES SEVERAL FEASIBLE REMEDIAL ACTIONS TO PREVENT FURTHER ECOLOGICAL DEGRADATION AND REDUCE OR ELIMINATE PUBLIC HEALTH HAZARDS ASSOCIATED WITH CADMIUM, NICKEL, AND COBALT. THE THREE AREAS OR AREA 1 OF THIS SITE INCLUDE EAST FOUNDRY COVE MARSH, EAST FOUNDRY COVE, AND CONSTITUTION MARSH. WE CONCUR WITH YOUR SELECTION OF THE NO ACTION ALTERNATIVE (CM-1) FOR CONSTITUTION MARSH. WE FEEL THE POTENTIAL FOR DESTROYING AN IMPORTANT NATURAL RESOURCE SUCH AS CONSTITUTION MARSH BASED ON VERY LIMITED INFORMATION CANNOT BE JUSTIFIED.

HOWEVER, WITH REGARDS TO EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE, WE CANNOT CONCUR WITH YOUR CHOICE OF ALTERNATIVES, ECM-3 AND EC-3, RESPECTIVELY. THE POINT OF NON-CONCURRENCE IS THE ON-SITE DISPOSAL OF DREDGE MATERIAL AND VEGETATION. WE FEEL THAT THE PRESENCE OF THE DREDGE MATERIAL AND HARVESTED VEGETATION LOCATED ON-SITE AT THE NEARBY MARATHON BATTERY PLANT, EVEN THOUGH FIXATED, COULD DISSOCIATE AND RECONTAMINATE THE EAST COVE AND CONSTITUTION MARSH IN THE EVENT OF A HURRICANE OR TROPICAL STORM MOVING ACROSS THE AREA OR EXTREMELY HEAVY RAINS OF A LONG DURATION. WE, THEREFORE, RECOMMEND AND SUPPORT ALTERNATIVES ECM-2 AND EC-2. BECAUSE OF THE LONGTERM AND POTENTIALLY ECOLOGICALLY DAMAGING BIOACCUMULATION OF CADMIUM AND NICKEL BY LIVING RESOURCES, THE CONTAMINATED DREDGE MATERIAL AND VEGETATION MUST BE REMOVED AS FAR AWAY AS FEASIBLE AND PRACTICABLE FROM EAST FOUNDRY COVE, CONSTITUTION MARSH, AND THE HUDSON RIVER SYSTEM. WE ALL KNOW THE RAMIFICATIONS OF PCB CONTAMINATION IN THE HUDSON RIVER. IT IS OUR OPINION AND CONCERN THAT THE PRESENCE OF CONTAMINATED DREDGE MATERIAL AND VEGETATION ON-SITE WOULD CONTINUE TO BE A POTENTIAL SOURCE OF CADMIUM, NICKEL, AND COBALT TO THE HUDSON RIVER ECOSYSTEM.

WE UNDERSTAND THAT BY DOING NOTHING IN CONSTITUTION MARSH, A CONTINUOUS SOURCE OF CADMIUM, NICKEL, AND COBALT WILL GO UNABATED. THE CONTAMINANT CONCENTRATIONS IN CONSTITUTION MARSH, HOWEVER, ARE CONSIDERABLY LOWER THAN IN EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE. BECAUSE CONSTITUTION MARSH WILL ACT AS A CONTINUOUS SOURCE OF CONTAMINANTS TO EAST FOUNDRY COVE, WE FEEL THAT IT WOULD BE ONLY APPROPRIATE TO REMOVE ALL SEDIMENTS FROM EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE THAT EXCEED 10 PPM CADMIUM AS OPPOSED TO YOUR LIMIT OF 100 PPM. THIS WOULD PROVIDE A 10 TIMES GREATER LEVEL OF "PROTECTION" TO THE LIVING RESOURCES. IF CONTAMINANTS LEAVE CONSTITUTION MARSH AND A SIGNIFICANT NUMBER OF SAMPLES DURING MONITORING EQUAL OR EXCEED 100 PPM, THEN A SECOND DREDGING PROJECT SHOULD BE UNDERTAKEN. THIS POSSIBILITY SHOULD NOT BE DISCOUNTED. WE, THEREFORE, ENCOURAGE THE LONGTERM MONITORING OF EAST FOUNDRY COVE FOR ADDITIONAL TOXIC ACCUMULATION OF THE SUBJECT CONTAMINANTS.

THE U.S. FISH AND WILDLIFE SERVICE REQUESTS TO BE INTIMATELY INVOLVED IN THE DESIGN OF THE LONGTERM MONITORING STUDIES AND AN ACTIVE PARTICIPANT IN THE COLLECTION OF THE DATA FOR ANALYSES.

WE APPRECIATE THE OPPORTUNITY TO REVIEW THE SUBJECT DOCUMENTS AT THIS STAGE AND LOOK FORWARD TO CONTINUED COORDINATION DURING THIS PROJECT AS WELL AS FUTURE PROJECTS. PLEASE KEEP US INFORMED AS THIS ACTION PROCEEDS.

SINCERELY YOURS,

PAUL P. HAMILTON
FIELD SUPERVISOR
CC:
NYSDEC, ALBANY, NY (ATTN: R. SLOANE)
NYSDEC, NEW PALTZ, NY.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AUGUST 18, 1986

JOEL SINGERMAN
WESTERN NEW REMEDIAL ACTION SECTION
USEPA, REGION II
26 FEDERAL PLAZA
NEW YORK, NY 10278

DEAR MR. SINGERMAN:

THE REGIONAL STAFF HAS COMPLETED THE REVIEW OF THE DRAFT RI/FS REPORTS SUBMITTED BY EBASCO FOR THE MARATHON BATTERY SITE. THE FOLLOWING THREE STATEMENTS SUMMARIZE OUR CONCLUSIONS.

1. CARRY OUT IMMEDIATE REMOVAL (IR) OF HIGH CONTAMINATION SOURCES AT THE PLANT, OUTFALL, EAST FOUNDRY MARSH, AND THE TWO HOT SPOTS IN CONSTITUTION MARSH.

2. WITH THE IR UNDERWAY AND UNDER LESS URGENT CIRCUMSTANCES, SOLICIT SUGGESTIONS FROM ALL INVOLVED AGENCIES AND BODIES FOR STUDY AND REMEDIATION OF THE LARGER AREAS OF CONSTITUTION MARSH, COVES, AND THE RIVER. CONSIDER ALL SUGGESTIONS THOROUGHLY AND CONDUCT ADDITIONAL PILOT/BENCH STUDIES IF NECESSARY.

3. DEFER ANY FURTHER INVESTIGATION/STUDY OF THE COVES AND THE RIVER UNTIL AFTER THE IR IS COMPLETE. CONDITIONS IN THE COVES AND THE RIVER ARE INTIMATELY TIED WITH THOSE IN THE TIDAL FLATS AND OUTFALL AND WILL CHANGE DURING AND AFTER THE IR.

OTHER MORE SPECIFIC CONCERNS/SUGGESTIONS ARE IN THE ATTACHED SHEETS.

IF YOU HAVE ANY QUESTIONS PLEASE CALL.

SINCERELY,
RAMANAND PERGADIA, P.E.
REGION 3

RP:MBH
CC: W/ATTACHMENT:
D. SACHDEV, EBASCO SERVICES INC.
A. BITTNER, PUTNAM COUNTY HEALTH DEPT.
R. FOLTINE, DEC, ALBANY
R. SLOAN, DEC, ALBANY.

NYSDEC REGION 3

MARATHON BATTERY

COMMENTS ON EBASCO'S SUPPLEMENTARY RI/FS REPORT

REVIEW PERIOD

THE REGION IS CONCERNED THAT A PROJECT OF THIS MAGNITUDE IS SET ON A PRECIPITATE COURSE OF ACTION. THE REGION FEELS THAT THE TWO WEEK REVIEW PERIOD IS INSUFFICIENT TO FULLY EVALUATE THE RI/FS REPORTS AND ITS COMMENTS SET FORTH HEREIN SHOULD NOT BE CONSTRUED AS A LISTING OF ALL ITS CONCERNS OR SUGGESTIONS BUT ONLY THOSE IT CAN FORM WITH THE GIVEN TIME CONSTRAINTS.

RISK ASSESSMENT & CLEANUP LEVEL

THERE IS A WIDE DISPARITY IN THE SUGGESTED CLEANUP LEVEL OF 100 MG/KG AND THE ACCEPTABLE CONCENTRATION OF 900 MG/KG BASED ON RISK ASSESSMENT. RECONCILIATION OF THE TWO FIGURES IS WARRANTED BECAUSE OF THE ADVERSE EFFECT ON THE SCOPE AND COST OF THE PROJECT OF AN ARBITRARY LOW CLEANUP LEVEL.

SUGGESTED CLEANUP METHODS

1) FOR THE PLANT SITE, OUTFALL, EAST FOUNDRY MARSH, AND THE HOT SPOTS IN CONSTITUTION MARSH, EXCAVATION IS OBVIOUSLY SUGGESTED. IN VIEW OF THE POOR MOBILITY OF THE METALS UNDERGROUND, THE EXCAVATED MATERIAL MAY BE DISPOSED ON SITE IN A CONTAINMENT STRUCTURE DESIGNED TO PROVIDE PUBLIC AMENITY SUCH AS PIER, ACCESS ROAD, PARKING LOT, CAUSEWAY, ETC. A FIXATION METHOD MAY ALSO BE USED TO SERVE OR COMPLEMENT THE PURPOSE.

2) IN ORDER TO REDUCE THE TRAUMA ON THE ECOSYSTEM AN "OVERNIGHT" REMEDIATION OF THE LARGER AREA OF THE CONSTITUTION MARSH SHOULD BE AVOIDED. A PROGRAM OF RESTORATION OF THE MARSH OVER A LONG PERIOD (SAY TEN YEARS) SHOULD BE INSTITUTED. WHILE THERE MAY BE OTHER WAYS TO ACHIEVE THE OBJECTIVE THE FOLLOWING ARE SUGGESTED:

A) SET UP INLET AND OUTLET FLAP GATES AT ONE OR BOTH OF THE TRESTLE OPENINGS. THESE GATES WILL SERVE TO CONTROL FLOW INTO THE MARSH AND THE ELEVATION OF IMPOUNDED WATER TO SUIT A REASONABLY DESIGNED ACID LEACH/BASE RECOVERY/ULTRAFILTRATION SYSTEM. THE ACID LEACH TEST MENTIONED IN THE RI REPORT DOES NOT SIMULATE (??).

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS

AUGUST 20, 1986

SUPERFUND BRANCH

MR. JOEL SINGERMAN
PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR MR. SINGERMAN:

ENCLOSED IS A SET OF COMMENTS AS SUBMITTED BY THE CORP OF ENGINEERS (COE) LAB, OMAHA, NEBRASKA ON THE SUPPLEMENTAL DRAFT REMEDIAL INVESTIGATION AND FEASIBILITY STUDY DOCUMENTS FOR THE MARATHON BATTERY COMPANY SITE, NEW YORK. BECAUSE OF THE SEVERE TIME AND FUNDING LIMITATIONS FOR REVIEW OF THESE DOCUMENTS, I WANT TO EMPHASIZE THAT THESE ENCLOSED COMMENTS ARE NOT THE RESULT OF A FULL COE REVIEW. TO PROVIDE A FULL-SCALE COE REVIEW, A SIGNIFICANT INCREASE IN TIME AND FUNDING MUST BE MADE BY EPA FOR THIS PROJECT.

IF THERE ARE ANY QUESTIONS, CONTACT DONALD HOOKER AT FTS 758-5221.

SINCERELY,

PAUL D. BARBER
CHIEF, ENGINEERING DIVISION

ENCLOSURE.

MR. JOEL SINGERMAN
REMEDIAL PROJECT MANAGER
U S ENVIRONMENTAL PROTECTION AGENCY
26 FEDERAL PLAZA
NEW YORK CITY, NY 10278

AUGUST 31, 1986

RE: EPA WORK ASSIGNMENT NO. 17-2L37.0
EPA CONTRACT NO. 68-01-7250
CONTRACTOR: EBASCO SERVICES, INC.

TITLE: "FINAL SUPPLEMENTAL FEASIBILITY STUDY REPORT MARATHON BATTERY COMPANY SITE (CONSTITUTION MARSH AND FOUNDRY COVE) VILLAGE OF COLD SPRING, PUTNAM COUNTY, NY AUGUST 1986"

AND:

TITLE: "FIELD OPERATING PLAN (ETC.,)"

AND

THE "DRAFT REPORT (1985)"

MR. SINGERMAN,

AT A PUBLIC HEARING HELD AT THE PHILIPSTOWN TOWN HALL ON AUGUST 26TH, 1986, YOU INVITED COMMENT REGARDING THE ABOVE MENTIONED STUDY REPORT (1986), ITS VARIOUS PARTS, AND THE CONDUCT OF THE MEETING/HEARING.

PLEASE NOTE THAT AT THE PUBLIC HEARING YOU (OR YOUR ASSOCIATE) DISPLAYED (3) SEPARATE VOLUMES THAT COMPRISED THE ENTIRE STUDY REPORT (1986). THE TOWN CLERK'S OFFICE (PHILIPSTOWN TOWN HALL) COULD ONLY LOCATE (2) SEPARATE VOLUMES FOR MY STUDY. THOSE VOLUMES ARE IDENTIFIED ABOVE.

MY COMMENTS (BELOW) ARE MADE CONCERNING THOSE TWO VOLUMES OF THE STUDY REPORT (1986) AND DRAFT REPORT (1985), ONLY.

A. "FIELD OPERATING PLAN (ETC,.)"

I FOUND THAT THE "FIELD OPERATING PLAN (ETC,.)" WAS COMPLETE AND COULD PROVIDE GOOD PERSONNEL SAFETY PROCEDURES, SAMPLE INTEGRITY, AND SAMPLE TRACEABILITY.

CERTAIN ASPECTS OF THE "FIELD OPERATING PLAN (ETC,.)" WERE FOUND TO BE SOMEWHAT CUMBERSOME TO PERFORM, BUT MAY BE NECESSITATED BY VARIOUS RULES AND REGULATIONS THAT I AM NOT AWARE OF.

B. "FINAL SUPPLEMENTAL FEASIBILITY STUDY REPORT (1986) (ETC,.)"

I FOUND THIS STUDY REPORT (1986) TO BE SERIOUSLY FLAWED.

THE FOLLOWING COMMENTS WILL CONFINE THEMSELVES TO THOSE PORTIONS OF THE STUDY REPORT (1986) THAT CONTAIN SERIOUS FLAWS OF COMMISSION AND OMISSION.

B.1 PUBLIC HEALTH

THROUGHOUT THE BODY OF THE STUDY REPORT (1986) THERE IS DIRECT STATEMENT OF "PUBLIC HEALTH HAZARD".

- THERE IS NO INSTANCE WITHIN THE STUDY REPORT (1986) WHERE THE "PUBLIC HEALTH HAZARDS" ARE DEFINED.

- THERE IS NO INSTANCE WITHIN THE STUDY REPORT (1986) WHERE THERE IS A DESCRIPTION OF THE METHOD OF

CONTRACTION OF THE "PUBLIC HEALTH HAZARDS".

- THERE IS NO MENTION OF "PUBLIC HEALTH HAZARDS" WITHIN THE BIBLIOGRAPHY.

NOTE: A PRIOR DRAFT REPORT (1985) STATED THAT THERE WERE CONCERNS REGARDING CERTAIN MATTERS:
- WATER
- HUMAN CONSUMPTION OF BIOTA.

COMMENT: THERE WAS NO EVIDENCE PRESENTED IN EITHER THE DRAFT REPORT (1985) OR THIS STUDY REPORT (1986) FOR A POSITIVE STATEMENT REGARDING "PUBLIC HEALTH HAZARDS".

I FEEL CONSTRAINED TO COMMENT ON BOTH THE ITEMS (MENTIONED ABOVE) NOTED IN THE DRAFT REPORT (1985).

- WATER CONTAMINATION

THE WATER RESIDING WITHIN FOUNDRY COVE AND CONSTITUTION MARSH IS CLASSIFIED BY NYSDEC AS CLASS B FOR RECREATIONAL USE (NOT POTABLE WATER FOR HUMAN CONSUMPTION). THE CADMIUM CONTENT (DISSOLVED) SHALL NOT EXCEED 0.3 MG/L (AS SPECIFIED IN THE STUDY REPORT (1986)). THE DATA REPORTED IN THE DRAFT REPORT (1985) INDICATES THAT THE MAXIMUM CONCENTRATION OF DISSOLVED CADMIUM (ABOVE THE "HOT SPOTS") WAS 0.18 MG/L OR 40% BELOW THE ALLOWABLE MAXIMUM.

THIS LEVEL OF CADMIUM CONTAMINATION IS ACCEPTABLE BY NYSDEC AND IS NOT CONSIDERED TO BE HAZARDOUS.

NOTE: THE STUDY REPORT (1986) MAKES NO COMMENT CONCERNING THE TESTED LEVELS OF CADMIUM CONCENTRATION FOUND.

- HUMAN CONSUMPTION OF BIOTA

  - COMMENT FROM THE DRAFT REPORT (1985) INDICATES THAT THE MOST COMMONLY INGESTED ITEM IS THE BLUE CRAB.

  - CADMIUM INTAKE BY THE BLUE CRAB IS CONCENTRATED IN THE HEPATOPANCREAS, GONADS, GILLS, AND OTHER SOFT TISSUES. THESE PARTS ARE USUALLY CALLED "THE DEADMAN" (WITHIN THE CRAB). THE "DEADMAN" IS NOT CONSIDERED TO BE EDIBLE AND IS CUSTOMARILY DISCARDED PRIOR TO CONSUMPTION.

  - CADMIUM INTAKE BY FISH IS CONCENTRATED IN THE LIVER, GONADS, AND SOFT ORGANS. THESE ORGANS ARE CUSTOMARILY REMOVED PRIOR TO PREPARATION FOR HUMAN CONSUMPTION.

NOTE: BASED ON DATA WITHIN THE DRAFT REPORT (1985), CONSUMPTION OF (10) BLUE CRABS PER DAY (3,650 PER YEAR) FOR A PERIOD OF (50) YEARS (182,500 CRABS) MIGHT PRODUCE DISCERNIBLE SYMPTOMS WITHIN A HUMAN.

NOTE: THE STUDY REPORT (1986) MAKES NO COMMENT REGARDING CONSUMPTION OF THE BIOTA.

- FOOD CHAIN

  - THE DRAFT REPORT (1985) STATES THAT THERE IS NO DISCERNIBLE UPWARD CONCENTRATION OF CADMIUM AS THE FOOD CHAIN PROCEEDS TOWARD MAN.

  - THE STUDY REPORT (1986) CONTAINS NO COMMENT REGARDING THE FOOD CHAIN OR ITS POSSIBLE EFFECTS UPON PUBLIC HEALTH MATTERS.

- METAL CONTAMINANTS IN SEDIMENTS

  - THE STUDY REPORT (1986) AND THE DRAFT REPORT (1985) STATE, IN MANY PLACES IN EACH REPORT, THAT THERE ARE NO STANDARDS FOR CADMIUM, NICKEL OR COBALT CONCENTRATIONS IN SEDIMENTS.

- DAMAGE TO THE BIOTA

- BOTH THE STUDY REPORT (1986) AND THE DRAFT REPORT (1985) STATE THAT THERE IS NO DISCERNIBLE EFFECT ON THE BIOTA.

NOTE: THE BIOTA HAS BEEN RESIDING IN THE FOUNDRY COVE AND CONSTITUTION MARSH DURING THE ENTIRE PERIOD OF CONTAMINATION BY THE BATTERY COMPANY (34 YEARS).

** CONCLUSIONS **

A. THE DISSOLVED CADMIUM, NICKEL AND COBALT CONCENTRATION FOUND IN THE WATERS OF FOUNDRY COVE AND CONSTITUTION MARSH ARE ACCEPTABLE QUALITY.

B. THERE ARE NO STANDARDS FOR CADMIUM, NICKEL OR COBALT IN SEDIMENTS.

C. CADMIUM DOES NOT CONCENTRATE UPWARD (TOWARD MAN) IN THE FOOD CHAIN.

D. THERE IS NO DISCERNIBLE EFFECT ON THE BIOTA (AFTER 34 YEARS).

E. CONSUMPTION OF RESIDENT AQUATIC LIFE WITHIN FOUNDRY COVE AND CONSTITUTION MARSH DOES NOT POSE A THREAT TO HUMANS.

A "PUBLIC HEALTH HAZARD" HAS NOT BEEN DEMONSTRATED OR PROVED]

I SUGGEST THAT ALL REFERENCES TO PUBLIC HEALTH HAZARD BE REMOVED FROM THE STUDY REPORT (1986).

C. TESTING AND REMEDIAL MEASURES AT OTHER SITES AND LOCATIONS

! COLD SPRING DOCK AT THE WESTERN TERMINUS OF MAIN STREET

- THE STUDY REPORT (1986) MAKES NO MENTION OF EITHER FURTHER STUDY OR REMEDIAL ACTION AT THIS LOCATION

- PERSONS ATTENDING THE PUBLIC HEARING (AUGUST 26, 1986) WERE TOLD BY YOU OR YOUR ASSOCIATES THAT ADDITIONAL TESTING WOULD BE CONDUCTED AT THIS SITE.

! CONSTITUTION DRIVE, COLD SPRING, NY PRIVATE RESIDENTIAL PROPERTY

- RESIDENTS, WHO ATTENDED THE PUBLIC HEARING OF AUGUST 26, 1986, EXPRESSED CONCERN REGARDING WHETHER THIS STUDY REPORT (1986) OR THE REMEDIAL ACTION PROPOSED WOULD ADDRESS THEIR CONCERNS REGARDING THE CADMIUM CONTAMINATION LOCATED UPON THEIR PROPERTIES ALONG CONSTITUTION DRIVE. THOSE PERSONS WERE ASSURED BY YOU OR YOUR ASSOCIATES THAT THIS MATTER WOULD BE INVESTIGATED DURING THE REMEDIAL ACTION. THOSE PERSONS REITERATED THE FACT THAT "OTHERS" IN THE PAST HAVE GIVEN THE SAME ASSURANCES, BUT HAVE NEVER FULFILLED THE PROMISE.

- THE STUDY REPORT (1986) MAKES NO MENTION OF SUCH TESTS OR NO MENTION OF ANY REMEDIAL ACTION PLANNED FOR CONSTITUTION DRIVE.

** CONCLUSION **

! IT IS THE INTENT OF THE STUDY REPORT (1986) TO IGNORE THE EXISTING CONDITIONS ALONG CONSTITUTION DRIVE AND AT THE COLD SPRING DOCK.

D. POST REMEDIAL ACTION
RESIDUAL CONTAMINANT CONCENTRATION (SEDIMENTS)

! THE STUDY REPORT (1986) CONTAINS MANY REFERENCES TO A RESIDUAL CONTAMINANT CONCENTRATION OF 100 MG/KG AS BEING THE GOAL OF THE REMEDIAL ACTION.

- ! NEITHER THE STUDY REPORT (1986) NOR THE DRAFT REPORT (1985) JUSTIFIES THE CHOICE OF 100 MG/KG FOR A RESIDUAL CONTAMINATION CONCENTRATION LEVEL.

- ! THE CHOICE OF 900 MG/KG AS DEFINED IN THE FINAL CONSENT JUDGEMENT WAS THE RESULT OF LONG AND PATIENT STUDY. IT WAS THE JUSTIFIED OPINION THAT THE 900 MG/KG LEVEL OR RESIDUAL CONTAMINATION WOULD NOT ADVERSELY EFFECT THE BIOTA.

- ! THE STUDY REPORT (1986) AND THE DRAFT REPORT (1985) BOTH CONFIRM THAT THERE HAS BEEN NO ADVERSE EFFECT ON THE BIOTA, EVEN AT LEVELS FAR EXCEEDING 900 MG/KG, DURING THE INTERVENING (14) YEARS SINCE THE PREVIOUS CORRECTIVE ACTION.

- ! THOROUGH READING OF THE STUDY REPORT (1986) INDICATES THAT THE CHOICE OF 100 MG/KG RESIDUAL CONCENTRATION OF CADMIUM IN THE SEDIMENTS WAS CHOSEN BY SOME UNKNOWN PROCESS OR ARBITRARY NATURE.

- ! THERE SEEMS TO BE THE INDICATION THAT THE STUDY REPORT (1986) CHOICE OF 100 MG/KG FOR RESIDUAL CADMIUM CONCENTRATION IN THE SEDIMENTS WAS ADOPTED AS A ONE ORDER OF MAGNITUDE COMPROMISE BETWEEN FACTIONS;

A. FACTION "A" WANTED CONTAMINATION REDUCED TO "BACKGROUND" LEVELS (STATED AS 10 MG/KG).
B. FACTION "B" WANTED TO LEAVE FOUNDRY COVE AND CONSTITUTION MARSH ALONE (ABOUT 1,000 MG/KG).

- ! WAS 100 MG/KG CHOSEN BY LOT, SHORT STRAWS, DART BOARD?

** CONCLUSION **

- THE CHOICE OF 100 MG/KG IS NOT JUSTIFIED IN THE STUDY REPORT (1986)

- ADOPT THE PREVIOUS JUSTIFIED STANDARD OF 900 MG/KG OF RESIDUAL CONCENTRATION OF CADMIUM IN SEDIMENT.

D. CONSTITUTION MARSH, REMEDIAL ACTION

- ! I AGREE WITH THE CONCLUSION OF THE STUDY REPORT (1986) THAT THE "NO ACTION" REMEDIAL ACTION OPTION SHOULD BE ADOPTED FOR CONSTITUTION MARSH.

E. EAST FOUNDRY COVE MARSH, REMEDIAL ACTION

- ! THE STUDY REPORT (1986) PROPOSED REMEDIAL ACTION (ECM-2 OR 3) AND (EC-2 OR 3) IS UN-NECESSARILY HARSH AND TOO WIDE RANGING IN SCOPE.

- ! THE IMPLEMENTATION OF THESE PROPOSED REMEDIAL ACTIONS WOULD RESULT IN THE PERMANENT DESTRUCTION OF THE EAST FOUNDRY COVE MARSH.

- ! STUDY REPORT (1986) PROPOSALS TO RE-BUILD EAST FOUNDRY COVE MARSH ARE FILLED WITH SELF-DOUBT AND TENTATIVE MEASURES THAT ARE DOOMED TO FAILURE.

- ! THE PROPOSAL TO BRING SEDIMENTS FROM HAVERSTRAW BAY TO EAST FOUNDRY COVER MARSH ARE NOT TO BE BELIEVED.

** CONCLUSION **

- ! INCORPORATION OF THE REMEDIAL ACTION PROPOSED IN THE STUDY REPORT (1986) WOULD BE AN INVITATION TO DISASTER.

F. MISCELLANY

- ! I HAVE NOT BELABORED YOU WITH ALL THE SMALLER ITEMS DISCOVERED DURING AN INITIAL READING OF THE STUDY REPORT (1986), SUCH AS;
  - MIS-SPELLINGS AND TYPOGRAPHICAL ERRORS

- CONTEXTUAL PROBLEMS CAUSED BY THE USE OF WORD PROCESSING
- PROGRAMS USING "CUT AND PASTE" TECHNIQUES.

! IMPORTANT QUESTIONS REMAIN UNRESOLVED BY THE STUDY REPORT (1986) BECAUSE CERTAIN DATA WAS OMITTED FROM THE STUDY REPORT (1986), SUCH AS;
- WHY WAS NO TEST DATA DEVELOPED FROM TEST BORINGS (EC-01 THRU EC-10) EBASCO (1986)? THIS LACK OF INFORMATION REPORTING SMACKS OF "COVER-UP", OR GROSS INEPTNESS OF TEST PROCEDURES.

! IF THE LACK OF REPORTED DATA WAS DUE TO INEPTNESS, I SUGGEST:

REJECT THE ENTIRE STUDY REPORT FROM EBASCO SERVICES, INC. DUE TO INCOMPETENCE]

IF THEY CAN'T GET DATA FROM (10) TEST BORINGS, WHAT KIND OF A MESS ARE THEY GOING TO MAKE OUT OF FOUNDRY COVE AND CONSTITUTION MARSH?

! IF THE LACK OF REPORTED DATA IS DUE TO "COVER-UP", I SUGGEST THAT THE REASON FOR THE COVER-UP WAS THAT THE CADMIUM CONCENTRATION IN THE SEDIMENT HAD DROPPED SUBSTANTIALLY DURING THE INTERVAL BETWEEN THE DRAFT REPORT (1985) AND THE CONDUCT OF THE TEST BORINGS. A SUBSTANTIAL REDUCTION IN THE CADMIUM CONTENT OF THE SEDIMENT WOULD INDICATE THAT NATURAL FORCES WERE MITIGATING THE PROBLEM, AND THE CONTRACTORS AND ENGINEERS WOULD NOT BE REQUIRED FOR THIS BOONDOGGLE. THE TAXPAYERS WOULDN'T HAVE TO FOOT THE BILL, EITHER.

G. ALTERNATE REMEDIAL ACTION

! THE STUDY REPORT (1986) LOOKED AT A NUMBER OF ALTERNATIVE POSSIBLE REMEDIAL ACTIONS, BUT NOT ALL POSSIBLE REMEDIAL ACTIONS.

! IF, IN THE FINAL ANALYSIS, IT IS FOUND TO BE ABSOLUTELY ESSENTIAL AND VITAL TO DREDGE AND DESTROY .....

! PLEASE CONSIDER A SIXTH ALTERNATE REMEDIAL ACTION, PROPOSAL

A. CONFINE ALL DREDGING OPERATIONS TO THE EXISTING "HOT SPOTS" (ABOVE 900 MG/KG).
B. REDUCE THE DEPTH OF DREDGING TO LESSEN THE IMPACT AND DESTRUCTION IN THE FOUNDRY COVE.
C. PROPOSED DREDGING SCHEDULE:
- OUTFALL BASIN (FROM BATTERY PLANT STORM DRAIN) FOLLOW PATH FROM BORINGS IDENTIFIED AS; (ECS-1 TO ECS-3) DREDGING DEPTH TO BE 16 TO 20 INCHES (MAX)
- "CHANNEL" FROM OUTFALL BASIN TO EAST COVE FOLLOW PATH FROM BORINGS IDENTIFIED AS; (ECS-1 TO ECS-3) DREDGING DEPTH TO BE 12 INCHES (MAX)
- BACKWATER "CHANNEL" AND BASIN FOLLOW PATH FROM BORINGS IDENTIFIED AS; (ECS-3 TO ECS-2) DREDGING DEPTH TO BE 10 INCHES (MAX)
- EAST FOUNDRY COVE ISOPLETH FOLLOW PATH FROM BORINGS IDENTIFIED AS; (ECS-3 TO ECMS-5, 6 & 7)
- UTILIZE SILT CURTAINS TO LOCALIZE THE TURBIDITY DURING DREDGING OPERATIONS. DO NOT USE EARTHWORK DIKES.
- IF DREDGING OPERATIONS ARE CONDUCTED AT; 1/2 FLOOD TIDE, TO FLOOD SLACK, TO 1/2 EBB TIDE THERE WILL BE ADEQUATE DEPTH OF WATER FOR THE OPERATION OF THE "MUD-CAT".

! THE DEWATERED, FIXATED RESIDUE WILL ONLY AMOUNT TO ABOUT 100 - 150 TRUCKLOADS (AT 16 TONS/TRUCK) AND WILL NOT SERIOUSLY AFFECT THE TRAFFIC PATTERNS OF THE VILLAGE.

! THE SIZE AND COST OF THE FACILITY TO PROCESS THE SEDIMENT WILL BE GREATLY REDUCED.

! ALL OF THE OPERATIONS COULD BE CONDUCTED DURING THE COURSE OF (1) SUMMER, THEREBY OBVIATING THE NECESSITY OF CONSTRUCTING PERMANENT BUILDINGS (AS NOW REQUIRED BY THE STUDY REPORT (1986)).

! THE OVERALL COST OF THE REMEDIAL ACTION WILL BE SUBSTANTIALLY REDUCED.

*** FINAL CONCLUSIONS ***

! DO NOT CREATE A SITUATION WHERE "THE OPERATION WAS A SUCCESS, BUT THE PATIENT DIED]".

! MY GRANDFATHER ALWAYS SAID, "IF IT AIN'T BROKE, DON'T FIX IT]".

! DO NOT CORRECT FOUNDRY COVE AND CONSTITUTION MARSH BY PAVING THEM WITH DOLLAR BILLS.

! DO NOT RUIN FOUNDRY COVE OR CONSTITUTION MARSH THRU INEPT MEDDLING]

VERY TRULY YOURS,

WILLIAM C. FARRELL
249 MAIN STREET
NELSONVILLE, NY 10516

(914)265-2511 HOME
(914)278-6151 OFFICE.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SEPTEMBER 2, 1986

MR. JOEL SINGERMAN
U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR JOEL:

IN THE FINAL ANALYSIS OF THE RI/FS BY EBASCO SERVICES INCORPORATED AND IN CONSIDERATION OF THE REMOVAL GUIDELINES FOR CADMIUM (ALSO NICKEL AND COBALT) FROM FOUNDRY COVE (I.E. "EAST FOUNDRY COVE AND EAST FOUNDRY COVE MARSH"), I WOULD LIKE THE FOLLOWING ISSUES, QUESTIONS AND CONCERNS CONSIDERED, RATHER THAN PROVIDING A BLANKET ENDORSEMENT OF A 100 PPM RESPONSE LEVEL FOR FOUNDRY COVE.

1. CERTAINLY THE 100 PPM CRITERIA WILL RESULT IN THE REMOVAL OF THE VAST MAJORITY OF THE EASILY RETRIEVED DEPOSITS. IF WE ARE CONCERNED, HOWEVER, ABOUT THE PREDOMINANT FORMS OF CADMIUM IN THE "COVE" BEING HIGHLY BIOAVAILABLE, IT MAKES LITTLE SENSE TO LEAVE SOME BEHIND (I.E. BETWEEN 10 AND 100 PPM) WHICH MAY STILL BE SUFFICIENT TO CONTINUE PRODUCING HIGH CONTAMINATION LEVELS IN THE BIOTA.

2. THE EXCAVATION APPARATUS ONCE OPERATIONAL COULD MORE EFFICIENTLY HANDLE THE FEW EXTRA YARDS REQUIRED FOR TOTAL REMOVAL RATHER THAN FACING THE POTENTIALLY MORE EXPENSIVE PROPOSITION AT A LATER DATE WHEN IT IS FOUND THAT THE EXCAVATION WAS INADEQUATE.

3. AS A POSSIBLE MODIFICATION TO COMPROMISE, WHICH I OFFER AS FOLLOW-UP TO A CONVERSATION WITH JAMES ROD OF THE NATIONAL AUDUBON SOCIETY, I SUGGEST CONSIDERING THE EAST COVE MARSH DIFFERENTLY THAN THE OPEN-WATER AREA OF EAST FOUNDRY COVE. SINCE CURRENT EXCAVATION PLANS TREAT EACH SECTION SEPARATELY, ESTABLISH A 100 PPM RESPONSE LEVEL FOR THE MARSH AREA BUT 10 PPM FOR THE OPEN WATER SEGMENT WHERE PRESUMABLY MOST OF THE EXCHANGES TO BIOTA OCCUR. THE CAPPING MATERIAL USED IN THE MARSH RESTORATION WOULD THEN ACT TO SEAL OFF SOME OF THE REMAINING CADMIUM. OF PARTICULAR POSSIBLE IMPORTANCE, A LAYER OF CLEAN MATERIAL WITH A HIGH CATION EXCHANGE CAPACITY, SUCH AS MONTMORILLONITE CLAY, COULD BE SPREAD OVER THE FRESHLY EXPOSED SEDIMENTS PREPARATORY TO ADDITIONAL FILL COMPOSED OF OTHER SOIL MATERIALS WITH LESSER ADSORPTIVE PROPERTIES. THE CLAY LAYER MIGHT ALSO REDUCE THE INFLUENCES OF GROUNDWATER ON MOBILIZATION OF THE REMAINING CONTAMINATED MATERIAL.

AS OF THIS WRITING, I STILL HAVE CONCERNS OVER THE INFLUENCES OF GROUNDWATER CONDITIONS BECAUSE THIS ISSUE WAS NEVER FULLY ADDRESSED IN THE WORK PERFORMED TO DATE. I UNDERSTAND SOME EVALUATION OF THE CONDITIONS ON-SITE AT THE PLANT WHICH I HAVE NOT SEEN IN DOCUMENTED FORM WERE SOMEWHAT DISCONCERTING. ASPECTS OF TIDAL INFLUENCE ON THE AQUIFER WERE APPARENT. HENCE, UNTIL I AM SHOWN OTHERWISE, ANY MEASURE TAKEN TO MINIMIZE AN ADVERSE SITUATION, POTENTIAL OR REAL, IS COMMENDED. UTILIZING CLAYS WITH HIGH CATION EXCHANGE CAPACITIES FOR CAPPING MATERIAL IN THE MARSH MIGHT PROVE USEFUL TO BIND SOME OF THE METALS WHICH REMAIN AFTER EXCAVATION.

4. EVALUATIONS OF THE FORMS OF CADMIUM EXISTENT IN FOUNDRY COVE AS COMPARED TO CONSTITUTION MARSH ARE STILL INADEQUATE. AT THE MOMENT, IT IS MY UNDERSTANDING THAT THE PREDOMINANT MATERIAL IN FOUNDRY COVE IS CDOH- AND CD(OH)2 (BASED ON THE ACRES RI) AND IS BIOAVAILABLE, WHEREAS IN CONSTITUTION MARSH THE ASSOCIATION IS WITH "ORGANIC LIGANDS", RESISTANT TO ACID EXTRACTION (EBASCO RI) AND THEREFORE PRESUMABLY NOT READILY AVAILABLE TO THE BIOTA, PARTICULARLY IF IT IS IN AN ANAEROBIC STRATA. GENERALLY, THIS IS A HYPOTHETICAL STATEMENT WHICH HAS NOT BEEN TESTED IN ITS ENTIRETY.

5. CADMIUM AT 10 PPM IS NOT AT BACKGROUND CONCENTRATIONS. TIVOLI BAY WHICH WAS USED AS THE CONTROL AREA IN THE ACRES RI PRODUCED CD CONCENTRATIONS AN ORDER OF MAGNITUDE LESS THAN WHAT WAS PURPORTED AT THE PUBLIC MEETING ON AUGUST 26, 1986 TO CONSTITUTE "BACKGROUND" CONCENTRATIONS FROM THE EARLIER RI, TIVOLI BAY (N=5) AVERAGED 1.63 PPM WITH A GEOMETRIC MEAN OF 0.998, AND SOUTH COVE WAS REPRESENTED BY ONLY TWO SAMPLES REPORTED IN THE ACRES RI WHICH WERE 7.6 PPM AND LT0.41 PPM IN THE UPPER 10 CM. ANOTHER SAMPLE TAKEN INDEPENDENTLY OF THE EARLIER RI, PRODUCED A CD CONCENTRATION IN A SURFACE GRAB SAMPLE FROM THE MOUTH OF INDIAN BROOK IN SOUTH COVE OF LT0.5 PPM. THEREFORE, EVEN AT 10 PPM WE WOULD NOT APPROACH "BACKGROUND".

6. THE WATERS OF THE HUDSON RIVER INCLUDING THE SAMPLES EVALUATED IN FOUNDRY COVE AND CONSTITUTION MARSH REFLECT RELATIVELY LOW HARDNESS VALUES WITH CIRCUMNEUTRAL PH'S. HOWEVER, THERE ARE EXCURSIONS TO EVEN LOWER VALUES FOR BOTH VARIABLES. THE PUBLISHED LITERATURE ON WHICH THE NATIONAL CRITERIA ARE BASED, SHOW THAT THESE VARIABLES ARE IN THE RANGE IN WHICH SOME IMPACTS FROM CADMIUM UPTAKE WOULD BE EVIDENT. SOME DATA ON THESE CONDITIONS WERE TAKEN DURING THE BIOASSAY ACTIVITIES DURING THE ACRES RI BUT THEY WERE NEVER EVALUATED WITH RESPECT TO POTENTIALLY INFLUENCING UPTAKE. IN FOUNDRY COVE, HOW PH AND HARDNESS ARE AFFECTING BIOACCUMULATION IS UNKNOWN. REGARDLESS, SEDIMENT CONCENTRATIONS AT THE PIER SITE HAD A GEOMETRIC MEAN OF 42 PPM IN THE 0-10 CM LAYERS (N=7). BIOASSAYS AT THIS SITE PRODUCED ANIMALS SIGNIFICANTLY HIGHER IN CADMIUM CONCENTRATIONS THAN THE SAME SPECIES USED IN THE TIVOLI BAY CONTROL UPTAKE EXPERIMENT (ACRES RI). HENCE, THIS SECTOR OF THE HUDSON RIVER, WHICH HAD LESS THAN 100 PPM CD IN THE SEDIMENT AND WATER CONCENTRATIONS THAT WERE "NOT DETECTED" AT LT0.0005 PPM, STILL EXHIBITED AN ADVERSE INFLUENCE.

7. DEVELOPMENT OF THE "900 PPM" HUMAN HEALTH EFFECT LEVEL IS INADEQUATE AND INCOMPLETE. ADDITIONAL BIOASSAYS AS WE HAD ORIGINALLY REQUESTED FOR THIS RI PHASE WOULD HAVE BEEN EXTREMELY HELPFUL IN BETTER EVALUATING THE BIOLOGICAL, INCLUDING HUMAN, CONSEQUENCES OF THE CONTAMINATION IN FOUNDRY COVE AND CONSTITUTION MARSH. ANECDOTALLY, PEOPLE I HAVE SPOKEN WITH SINCE THE PUBLIC MEETING ARE SKEPTICAL AT BEST, PARTICULARLY GIVEN WHAT IS KNOWN CURRENTLY, ALTHOUGH IT IS LIMITED, ABOUT BIOACCUMULATION IN THE SYSTEM.

AS PART OF THIS PROBLEM, I FIND THE CONSIDERATIONS MADE FOR THE JUDGEMENT OF 900 PPM INCOMPLETE BECAUSE A COMPLETE EVALUATION SHOULD ALSO INVOLVE ROUTES SIMILAR TO THOSE DEPICTED IN FIGURE 8-1 OF THE RI WHICH WOULD INCLUDE:

SEDIMENTS	PLANTS, ETC.	CRAYFISH	
"	PLANTS	HUMANS	
"	PLANTS, ETC.	TURTLES	HUMANS
"	PLANTS, ETC.	FROGS	HUMANS
"	PLANTS, ETC.	MAMMALS *	HUMANS

* MAMMALS COULD INCLUDE SUCH SPECIES AS MUSKRATS, RACCOON, OPOSSUM AND DEER.

8. ONE ASPECT OF THE RI WHICH HAS NOT BEEN EXAMINED AT ALL IS RELATED TO THE FUTURE. CADMIUM WILL NEVER DISAPPEAR SINCE IT IS AN ELEMENT, AND WHATEVER CONTAMINATION IS LEFT MAY PRODUCE AN "ACCEPTABLE" RISK TODAY. HOWEVER, WHEN (NOT "IF") SOCIOECONOMIC CONDITIONS AND DEMOGRAPHIC PATTERNS CHANGE, THERE MAY WELL BE A GREATER RELIANCE ON "NATIVE" FOODS SUCH AS CATTAIL TUBERS, FROGS, TURTLES, RACCOONS, OPOSSUM, MUSKRATS, CRAYFISH, SNAILS OR OTHER ITEMS WHICH MOST PEOPLE TODAY MIGHT FIND DISGUSTING. PRESSURES ON SPECIES WHICH ARE NOW SOUGHT AFTER, SUCH AS BLUE CRAB AND WATERFOWL, MAY ALSO INCREASE. HENCE, THE RISK FACTOR(S) WOULD ALSO RISE.

9. IF MY CONCERNS RESULT IN A DELAY IN THE RECORD OF DECISION, SO BE IT. SINCE, THE FUNDS FOR CERCLA ARE STILL PENDING RE-AUTHORIZATION, THE ONLY THING LOST WILL BE SOME TIME WHILE WAITING FOR CONGRESS TO ACT. IF A ROD IS NOT FORTHCOMING BY OCTOBER 1ST, WOULD THE PROJECT REALLY BE JEOPARDIZED?

I HAVE TRIED TO BE REASONABLE IN MY ASSESSMENT OF THE SITUATION. IF I HAVE NOT BEEN TOTALLY FAIR OR EVEN NEEDED TO GO FURTHER PERHAPS SOME OF THOSE RECEIVING CARBON COPIES MAY CARE TO EXPAND ON OR ADD ADDITIONAL TOPICS AND THOUGHTS.

YOURS FOR A BETTER TOMORROW,

RONALD SLOAN, PH.D.

RS/FS
CC: J. HANLON
J. HICKEY
M. KAUTZ
J. ROD
T. REYNOLDS
J. IANNOTTI.

DEPARTMENT OF HEALTH

SEPTEMBER 2, 1986

JOEL SINGERMAN
WESTERN NEW REMEDIAL ACTION SECTION
USEPA, REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

SUBJECT: MARATHON BATTERY
SUPERFUND
(PHILIPSTOWN)

DEAR MR. SINGERMAN:

HAVING REVIEWED THE EBASCO'S SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY ON THE SUBJECT PROJECT WE SUBMIT HEREWITH THE FOLLOWING COMMENTS:

1. AS IN THE PAST, WE WISH TO RESTRICT OUR COMMENTS ON THE PROPOSALS TO PUBLIC HEALTH IMPACTS AS OPPOSED TO ECOLOGICAL IMPACTS. IT IS FELT THAT MR. RON SLOAN OF NYSDEC AND MR. JIM ROD OF THE AUDUBON SOCIETY ARE BETTER ABLE TO ADDRESS THESE CONCERNS.

2. FROM A PUBLIC HEALTH STANDPOINT THE 900 MG/KG LEVEL HAS BEEN DETERMINED TO BE A SAFE LEVEL. IMMEDIATE CLEANUP DOWN TO THIS LEVEL SHOULD BE IMPLEMENTED.

3. ALTHOUGH LEVELS LESS THAN THE 900 MG/KG SAFE LEVEL MAY STILL BE TOXIC TO BENTHIC AND OTHER ORGANISMS, WE LEAVE THIS RISK ASSESSMENT TO THOSE WHO HAVE MORE EXPERTISE AS STATED IN 1 ABOVE.

4. IN THE INTERIM, BEFORE DREDGING TO THE 900 MG/KG LEVEL IS COMPLETED, ADDITIONAL SIGNS INDICATING THE HEALTH CONCERNS AND ADVISORY RELATIVE TO THE CONSUMPTION OF SHELLFISH AND SHOULD BE PLACED ALONG ALL APPROACHES TO THE COVE, AND MARSH AREAS, I.E. FROM LAND AS WELL AS COASTAL APPROACHES.

SHOULD YOU HAVE ANY QUESTIONS, PLEASE CONTACT ME AT 225-3833.

VERY TRULY YOURS,

ANNE M. BITTNER
ASSISTANT PUBLIC HEALTH ENGINEER

AMB/JP

CC: R. PERGADIA, NYSDEC, NEW PALTZ
R. TRAMONTANO, NYSDOH, ALBANY
S. SINGH, NYSDEC, NEW PALTZ
B. FOLTINE, NYSDEC, ALBANY.

MR. JOEL SINGERMAN
REMEDIAL PROJECT MANAGER
U S ENVIRONMENTAL PROTECTION AGENCY
26 FEDERAL PLAZA
NEW YORK CITY, NY 10278

SEPTEMBER 3, 1986

RE: EPA WORK ASSIGNMENT NO. 17-2L37.0
EPA CONTRACT NO. 68-01-7250
CONTRACTOR: EBASCO SERVICES, INC.

RE: ADDENDUM TO PRIOR FOUNDRY COVE/CONSTITUTION MARSH LETTER

DEAR MR. SINGERMAN,

JUST A SHORT NOTE.

THE (3RD) VOLUME WAS FOUND AND IS UNDER STUDY.

THE FOLLOWING QUOTE WAS FOUND IN SECTION IX ON PAGE 9-3 IN THE 2ND PARAGRAPH:

"THAT LESS THAN OR EQUAL TO 900 MG/KG CADMIUM IN EAST FOUNDRY COVE AND CONSTITUTION MARSH POSES NO HEALTH RELATED CONCERNS.".

NOTE: THE EMPHASIS OF THE WORD "NO" IS MINE.

IF THE QUOTE IS CORRECT FOR EAST FOUNDRY COVE AND CONSTITUTION MARSH, IT SHOULD ALSO BE CORRECT FOR EAST FOUNDRY COVE MARSH. (SEE MY PREVIOUS LETTER RE CHOICE OF RESIDUAL CADMIUM CONCENTRATION IN SEDIMENTS).

MY INITIAL REACTION TO THE ENTIRE STUDY REPORT (1986), AFTER A SHORT READ THRU OF VOLUME 3, IS STILL THAT THIS REPORT IS SERIOUSLY FLAWED AND FILLED WITH UNSUPPORTED OPINION THAT SMACKS OF "DON'T CONFUSE ME WITH THE FACTS, MY MIND IS MADE UP]".

VERY TRULY YOURS,

WILLIAM C. FARRELL
249 MAIN STREET
NELSONVILLE, NY 10516
(914)265-2511 HOME
(914)278-6151 OFFICE.

STONY BROOK

9 SEPTEMBER 1986

MR. JOEL SINGERMAN, PROJECT MANAGER
NEW YORK/CARIBBEAN REMEDIAL ACTION BRANCH
U.S. ENVIRONMENTAL PROTECTION AGENCY
26 FEDERAL PLAZA, ROOM 747
NEW YORK, NY 10278

DEAR MR. SINGERMAN:

THIS IS IN REFERENCE TO YOUR REQUEST FOR COMMENTS ON THE REMEDIAL ALTERNATIVES FOR THE MARATHON SITE, AT COLD SPRING, NEW YORK.

I WAS VERY IMPRESSED WITH THE PRESENTATION OF YOUR GROUP AT COLD SPRING. GIVEN THE ALTERNATIVES, MY RESEARCH ON METAL UPTAKE OF THE INVERTEBRATES AT FOUNDRY COVE WOULD SUPPORT ALTERNATIVES 2, 3, AND 4, BUT WOULD PRECLUDE ALTERNATIVES 1 AND 5. THE BENTHIC INVERTEBRATES IN THE COVE HAVE HIGH CONCENTRATIONS OF CADMIUM, AND THESE ORGANISMS ARE THE BASE OF THE BENTHIC FOOD WEB. THERE IS NO CONCLUSIVE EVIDENCE, BUT THE BLUE CRAB CONTAMINATION PROBLEM IN THE HUDSON RIVER MAY BE RELATED TO THE MARATHON SITE. GIVEN THAT WE DO NOT KNOW THE EXACT MECHANISM OF CADMIUM UPTAKE, THE ALTERNATIVE OF CONTAINMENT IS UNWORKABLE.

GIVEN THE CURRENT SITUATION AND OUR LACK OF KNOWLEDGE, OFF-SITE DISPOSAL WOULD BE PRUDENT. THE EXACT MECHANISM OF DREDGING AND FIXATION IS BEYOND MY EXPERTISE, BUT I'M SURE YOU ARE AWARE OF A PREVIOUS DREDGING ATTEMPT, WHICH WAS NOT SUCCESSFUL. IT IS THEREFORE IMPERATIVE TO CONTINUE TO HAVE THE VERY BEST ENGINEERING ADVICE.

AT THE PRESENTATION, IT SEEMED THAT THE ENGINEERING FIRM HAD MENTIONED A CERTAIN LEVEL OF CADMIUM CONCENTRATION AS AN ACCEPTABLE HUMAN HEALTH RISK, AND HAD MADE DECISIONS BASED UPON THAT THRESHOLD. WHILE I AGREE THAT PRACTICAL SOLUTIONS ARE NECESSARY TO ENVIRONMENTAL PROBLEMS, IT MUST BE KEPT IN MIND THAT THIS LEVEL BEARS NO RELATIONSHIP TO ANY KNOWLEDGE WE HAVE ABOUT TRANSFER AND CONCENTRATION OF METALS (OR ANY OTHER CONTAMINANTS) THROUGH ECOSYSTEMS. THIS IS THE PREFERABLE INFORMATION BASE, AND, AS FAR AS I CAN SEE, THE REMEDIAL STUDY MADE NO ATTEMPT TO ASCERTAIN A LEVEL BASED UPON THIS CRITERION.

THANK YOU FOR GIVING ME THE OPPORTUNITY TO COMMENT ON THE REMEDIAL PLAN.

SINCERELY,

JEFFREY LEVINTON
PROFESSOR AND CHAIRPERSON.

MR. JOEL SINGERMAN
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

SEPTEMBER 11, 1986

DEAR MR. SINGERMAN,

OVER THE LAST YEAR I HAVE CONTINUED TO FOLLOW THE PROGRESS OF THE MARATHON BATTERY FEDERAL SUPERFUND PROJECT, COLD SPRING, NEW YORK. I UNDERSTAND THAT THE PROJECT IS PRESENTLY AT A MAJOR CROSSROADS WITH A RECORD OF DECISION TO BE MADE BY THE END OF THIS MONTH. THE FOLLOWING "COMMENTS" ARE MEANT TO BE HELPFUL AND ARE MADE IN THE BEST INTEREST OF WORKING TOWARD SUCCESS OF THE PROJECT;

1. MY FIRST CONCERN IS FOR THE USE OF 100 PPM CADMIUM (CD) AS THE RESPONSE LEVEL FOR REMOVAL OF SEDIMENTS FOR FIXATION AND DISPOSAL. IN REVIEWING THE ISOPLETHS FOR CD IN FOUNDRY COVE DEVELOPED AS PART OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) PERFORMED BY ACRES INTERNATIONAL, IT WOULD APPEAR THERE WILL HAVE TO BE SOME TRICKY ENGINEERING PERFORMED ON THE WEST SIDE OF THE COVE (AS WELL AS A FEW OTHER LESS EFFECTED AREAS) TO STAY AT OR ABOVE THE 100 PPM CD CRITERIA. IS IT ECONOMICALLY OR ENGINEERING WISE FEASIBLE/PRACTICAL TO STAY ABOVE THIS NUMBER AS OPPOSED TO REMOVING ALL SEDIMENT FROM OPEN WATER AREAS AND THEN USING A RESPONSE LEVEL FOR MARSH SOILS. IN LIGHT OF THE RESULTS FROM LIVE CAR STUDIES PERFORMED IN THE RI IN AREAS AT OR BELOW 100 PPM CD (LEVELS OF CD IN THE WATER COLUMN BELOW DETECTABLE LIMITS) IT WOULD SEEM A COMPLETE REMOVAL WOULD BE MORE ENVIRONMENTALLY SOUND. FROM ROUGH NUMBERS I'VE SEEN IN THE THE PAST OF YARDS OF MATERIALS REMOVED RELATIVE TO PPM CD LEVELS, IT APPEARED THE BULK OF SEDIMENTS IN THE COVE WERE ENCOMPASSED BY AN 100 PPM CRITERIA. WHAT INCREASE IN VOLUME AND COST WOULD THERE BE BY CONSIDERING ALL OPEN WATER SEDIMENTS IN THE COVE TO A PARTICULAR DEPTH? I UNDERSTAND AT A RECENT PUBLIC MEETING WHICH I AM SORRY I COULD NOT ATTEND BUT WAS ONLY AWARE OF IT A DAY OR TWO BEFORE, THERE WAS A STATEMENT THAT THE 100 PPM CD WAS AT LEAST MUCH BETTER THAN A DETERMINED 900 PPM CD HUMAN HEALTH RISK VALUE. COULD I PLEASE RECEIVE AN ADEQUATE EXPLANATION HOW THIS VALUE OF 900 PPM WAS DEVELOPED? OFF HAND I ASSUME IT CAME FROM THE 1972 U.S. ATTORNEY'S ACTION AGAINST MARATHON AND SONOTONE. IF THIS IS TRUE I BELIEVE THE LABORATORY BIOASSAY WORK PERFORMED TO ARRIVE AT THIS NUMBER WAS DISCLAIMED.

2. ONE OF THE TASKS PROMISED AT A PUBLIC MEETING ABOUT A YEAR AGO (SEPTEMBER 1985) WAS AN EVALUATION OF DREDGING EFFICIENCIES BY THE U.S. ARMY CORPS OF ENGINEERS. BASED ON THIS WORK WHICH I HAVE NOT HAD THE OPPORTUNITY TO REVIEW, HOW MUCH CONFIDENCE IS THERE IN EXCAVATION OF SEDIMENTS IF REMOVAL IS SELECTIVE?

3. I UNDERSTAND FROM SUPPLEMENTAL WORK PERFORMED IN CONSTITUTION MARSH THAT CADMIUM WAS FOUND TO BE BOUND IN ORGANIC LIGANDS WHICH PROVED TO BE NON-EXTRACTABLE BY ACID. THIS APPEARS TO BE GOOD NEWS FOR THE MAJORITY OF CONSTITUTION MARSH BUT I DON'T BELIEVE HOLDS TRUE FOR THE OPEN WATER AREA AT THE NORTH END OF THE MARSH. THERE HAD BEEN ONLY ONE SAMPLE TAKEN FROM THIS AREA AS PART OF THE RI WHICH HAD 700 PPM CD. IT IS FELT IF MORE SAMPLES HAD BEEN TAKEN, HIGHER CONCENTRATIONS WOULD HAVE BEEN FOUND (1000-3000 PPM CD). ALSO OF CONCERN IS THAT CONTAMINANTS IN THIS AREA ARE THE MORE BIO-AVAILABLE CARBONATES AND HYDROXIDES AND NOT THE MORE STABLE LIGANDS. IT IS WORTH NOTING THIS PORTION OF CONSTITUTION MARSH IS IN CLOSE PROXIMITY TO AN AREA IN FOUNDRY COVE WHICH HAD CADMIUM LEVELS BETWEEN 6500-50,000 PPM (DOCUMENTED IN STUDIES OTHER THAN THE RI). THE SEPARATION BETWEEN THE TWO AREAS IS ONLY A SMALL GAP AND ABOUT 500 TO 700 FEET. FROM PERSONAL OBSERVATION I KNOW THIS AREA IS A POPULAR SPOT FOR MIGRATORY WATERFOWL WHICH WERE FOUND IN THE RI TO HAVE SIGNIFICANT HIGH LEVELS OF CADMIUM. WITHOUT REMEDIATION OF AT LEAST THIS PORTION OF CONSTITUTION MARSH WE CAN ONLY EXPECT TO SEE CONTINUED DEGRADATION OF THE QUALITY OF LIFE/ENVIRONMENT FOR MEMBERS OF THE MARSH ECOSYSTEM. TO IGNORE AT LEAST THIS PORTION OF THE MARSH, THE OPEN WATER IN THE NORTH END, WOULD BE A SERIOUS OVERSIGHT.

THESE COMMENTS ARE OFFERED TO ALLOW ALL OF US TO ACT AS RESPONSIBLE GUARDIANS OF AN ENVIRONMENT WHICH WE SHARE. IF I COULD BE OF ANY ASSISTANCE PLEASE CONTACT ME AFTER 6:00 P.M. AT (518) - 895 - 2165.

SINCERELY,

THOMAS ROBERT REYNOLDS
BOX 83
DELANSON, NEW YORK 12053

CC: DR. RON SLOAN, NYSDEC
JIM ROD, AUDUBON
JOE IANNOTTI, NYSDEC
ANNE BITTNER, PUTNAM COUNTY HEALTH
GEORGE PAVLOU, U.S. EPA
WALT L. DEMICK, P.E., NYSDEC.

STATE OF NEW YORK DEPARTMENT OF HEALTH

SEPTEMBER 12, 1986

MR. JOEL SINGERMAN
REMEDIAL PROJECT MANAGER
U.S. EPA, REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR MR. SINGERMAN:

I HAVE RECEIVED COPIES OF THE FINAL SUPPLEMENTAL REMEDIAL INVESTIGATION (RI) REPORT, THE FINAL SUPPLEMENTAL FEASIBILITY STUDY (FS) REPORT (AUGUST, 1986) AND THE DRAFT RECORD OF DECISION (ROD) ON THE MARATHON BATTERY SITE FOR REVIEW. MY COMMENTS PERTAINING TO POTENTIAL PUBLIC HEALTH IMPACTS AND THE COMPLETENESS OF THE STUDIES ARE AS FOLLOWS:

(1) THE MOST PREFERRED REMEDIAL ALTERNATIVES FOR BOTH THE EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE AREAS INDICATE FINAL DISPOSAL OF FIXATED SEDIMENTS TO BE AT A LOCAL SANITARY LANDFILL. POSSIBLE USE AS DAILY COVER MATERIAL AT THE PLATTEKILL MUNICIPAL LANDFILL IS ALSO MENTIONED. FURTHER DETAILS SHOULD BE PROVIDED CONCERNING BOTH THE FINAL DISPOSAL OF THE FIXATED SEDIMENTS AND THE EFFECTIVENESS AND RELIABILITY OF THE CHEMICAL FIXATION PROCESS ITSELF. TWO OF THE THREE MIXTURES PREPARED BY ACES AND CHEMFIX WHICH PASS THE EP TOXICITY TEST STILL LEACH CADMIUM AT LEVELS GREATER THAN 0.7 PPM. THESE LEVELS ARE OVER 70 PERCENT OF THE MAXIMUM PERMISSIBLE LEVEL FOR PASSING THE TEST. THE THREE MIXTURES THAT DID NOT PASS THE EP TOXICITY TEST LEACHED CADMIUM AT LEVELS TWO ORDERS OF MAGNITUDE ABOVE THE LIMIT. QUESTIONS REMAIN REGARDING THE REPRODUCIBILITY OF THE BENCH SCALE TESTS AND ALSO WHAT THE SCALE-UP EFFECTS MIGHT BE. WILL THE FULL SCALE SEDIMENT FIXATION PROCESS YIELD SIMILAR RESULTS AS THOSE ACHIEVED IN THE LABORATORY? ALSO IT IS STATED THAT THE BENCH SCALE MIXTURES REACHED AN UNCONFINED COMPRESSIVE STRENGTH SUITABLE FOR LANDFILLING, I.E., GREATER THAN 1500 LBS/FT2. HOWEVER, IS THIS SUFFICIENT FOR THE PRODUCT TO BE USED AS DAILY COVER MATERIAL AT A MUNICIPAL LANDFILL?

THESE QUESTIONS SHOULD ANSWERED BEFORE IT CAN BE CONCLUSIVELY STATED THAT THE STABILIZED SEDIMENTS CAN BE TREATED AS NON-HAZARDOUS AND SUITABLE FOR DISPOSAL AT A SANITARY LANDFILL.

(2) THE MOST PREFERRED REMEDIAL ALTERNATIVE FOR THE CONSTITUTION MARSH SUB-AREA IS STATED TO BE THE NO ACTION ALTERNATIVE. NOTE THAT THIS ALTERNATIVE STILL LEAVES THE PRESENCE OF CADMIUM IN MARSH SEDIMENTS AT LEVELS RANGING FROM LESS THAN 100 MG/KG TO 940 MG/KG.

THESE CONTAMINATION LEVELS EXCEED THE STATED "NO-HEALTH CONCERN LEVEL" OF 900 MG/KG CADMIUM, AND FAR EXCEED THE "REMEDIATION LEVEL" OF 100 MG/KG CADMIUM AS ESTABLISHED BY U.S. EPA FOR CLEAN-UP OF SEDIMENTS IN AREA I.

WHY WAS "HOT SPOT" REMOVAL OF CONTAMINATED SEDIMENTS NOT EVALUATED AMONG THE REMEDIAL ALTERNATIVES FOR THE CONSTITUTION MARSH SUB-AREA? PLATE 2 FROM THE RI APPEARS TO INDICATE THAT MOST OF THE CADMIUM CONTAMINATION IS LOCATED IN THE TOP SEDIMENTS (0-10 CM) ALONG THE MAIN NORTH-SOUTH CHANNEL WITHIN CONSTITUTION MARSH. IT WOULD APPEAR THAT A LIMITED SEDIMENT REMOVAL EFFORT IN THIS AREA COULD REDUCE REMAINING SEDIMENT CADMIUM CONCENTRATIONS DOWN TO LEVELS APPROACHING THE 100 MG/KG REMEDIATION LEVEL. AT LEAST, THIS ALTERNATIVE SHOULD BE CONSIDERED AND EVALUATED ALONG SIDE THE OTHER ALTERNATIVES.

(3) THE FIRST PARAGRAPH ON PAGE 5 OF THE RI DISCUSSES THE EXPOSURE PATHWAYS IDENTIFIED FOR RISK ASSESSMENT. REGARDING CONTACT WITH CONTAMINATED SEDIMENT AND WATER THROUGH SWIMMING ACTIVITIES, INGESTION OF SUSPENDED SEDIMENTS IS THE PATHWAY OF CONCERN HERE. IN THE SAME PARAGRAPH IT IS STATED THAT CADMIUM POSES THE ONLY PUBLIC HEALTH THREAT. RATHER, IT SHOULD READ, PRINCIPAL PUBLIC HEALTH THREAT. ALTHOUGH THE POTENTIAL HEALTH IMPACTS POSED BY NICKEL ARE SMALL, IN COMPARISON TO CADMIUM, STILL, THEY DO EXIST.

(4) ON PAGE 6 OF THE RI, IT SHOULD BE CLARIFIED IN THE STATEMENT ON REMEDIAL RESPONSE OBJECTIVES THAT THE PREVENTION OF HUMAN EXPOSURE TO CONTAMINATED SEDIMENTS AND BIOTA IS INCLUDED IN THE OBJECTIVES.

IF YOU HAVE ANY QUESTIONS REGARDING THESE COMMENTS, PLEASE CONTACT ME AT (518) 473-8427.

SINCERELY,

DENNIS WEISS
ASSISTANT SANITARY ENGINEER
BUREAU OF TOXIC SUBSTANCE ASSESSMENT

DOC. 4088P

CC: DR. KIM
DR. HAWELY
MR. TRAMONTANO/ MR. HUDSON
MR. IANNOTTI
MS. BITTNER
MR. REILLEY.

DEPARTMENT OF THE ARMY

SEPTEMBER 15, 1986

SUPERFUND BRANCH

MR. JOEL SINGERMAN
PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR MR. SINGERMAN:

ENCLOSED ARE TWO SETS OF COMMENTS REGARDING THE FINAL SUPPLEMENTAL REMEDIAL INVESTIGATION (RI) FOR THE MARATHON BATTERY COMPANY SITE IN NEW YORK. THE ONE SET OF COMMENTS AS SUBMITTED BY MISSOURI RIVER DIVISION, LABORATORY (MHDED-L) ARE VERY SIMILAR TO THEIR COMMENTS REGARDING THE DRAFT SUPPLEMENTAL RI. SINCE WE ARE OUT OF FUNDS FOR THIS PROJECT, OTHER TECHNICAL PERSONNEL IN THE MISSOURI RIVER DIVISION AND KANSAS CITY DISTRICT DID NOT REVIEW THE RI AND THERE HAS NOT BEEN ANY REVIEW OF THE FS. BECAUSE OF THE SEVERE TIME AND FUNDING LIMITATIONS FOR REVIEW OF THESE FINAL RI/FS DOCUMENTS, I WANT TO AGAIN EMPHASIZE THAT THESE ENCLOSED COMMENTS ARE NOT THE RESULT OF A FULL COE REVIEW. A SIGNIFICANT INCREASE IN TIME AND FUNDING IS NECESSARY FOR US TO ADEQUATELY REVIEW THIS PROJECT.

YOUR WRITTEN RESPONSE TO THESE ENCLOSED COMMENTS IS REQUESTED. IF THERE ARE ANY QUESTIONS, CONTACT MR. DONALD HOOKER, OF MY STAFF, AT FTS 758-5221.

SINCERELY,

PAUL D. BARBER
CHIEF, ENGINEERING DIVISION

ENCLOSURES.

UNITED STATES DEPARTMENT OF THE INTERIOR

SEPTEMBER 19, 1986

MR. JOEL SINGERMAN
PROJECT MANAGER
U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 2
26 FEDERAL PLAZA
ROOM 747
NEW YORK, NEW YORK 10278

DEAR MR. SINGERMAN:

AS YOU KNOW FROM OUR TELEPHONE DISCUSSIONS, THE BUREAU OF MINES HAS A LONG AND SUCCESSFUL HISTORY OF DEVELOPING TECHNOLOGY FOR THE EXTRACTION OF METALS FROM HOST MATERIALS. IN THE LAST FEW MONTHS WE HAVE BEEN LOOKING AT THE ADAPTATION AND EXTENSION OF METALLURGICAL TECHNIQUES TO THE PROBLEMS OF CLEANUP OF SITES CONTAMINATED WITH HEAVY METALS. WHILE THE INITIAL FOCUS OF OUR REVIEW WAS FROM THE STANDPOINT OF THE PARTICULAR PROBLEMS OF THE MINERALS INDUSTRY, IT SOON BECAME EVIDENT THAT THERE WAS ANOTHER POTENTIAL APPLICATION FOR THIS TECHNOLOGY -- THE CLEANUP OF SUPERFUND SITES. ABOUT A MONTH AGO, WE CONTACTED THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PERSONNEL IN ALBANY TO EXPLAIN OUR INTERESTS AND OUR CAPABILITIES. AS PART OF THAT DISCUSSION, WE LEARNED OF THE STUDY DONE FOR THE ENVIRONMENTAL PROTECTION AGENCY UNDER CONTRACT 68-01-7250 ON WHAT IS CALLED THE "MARATHON BATTERY" SITE. WE THEN CONTACTED YOU, OBTAINED COPIES OF THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORTS AND REVIEWED THE REPORTS FROM THE STANDPOINT OF OUR PARTICULAR SPECIALTY -- THE TREATMENT OPTIONS.

AS I TOLD YOU, OUR DISCUSSIONS WITH REPRESENTATIVES OF THE REGULATORY COMMUNITY INDICATE THAT MANY HAVE A STRONG INTEREST IN TREATMENT OF CONTAMINATED SOILS TO REMOVE METALS OR IN OTHER ALTERNATIVES TO THE TRADITIONAL METHODS. THERE SEEMS TO BE LITTLE EXPERIENCE WITH ALTERNATIVE APPROACHES AND A GENERAL UNFAMILIARITY WITH THE SOMEWHAT SPECIALIZED TECHNOLOGIES AND APPROACHES USED BY METALLURGISTS. PERHAPS THE MOST DISTINGUISHING CHARACTERISTIC OF THIS APPROACH, AND ONE THAT WILL BE REFERRED TO LATER IN THIS LETTER, IS THE WAY METALLURGISTS WOULD APPROACH A PROBLEM SUCH AS YOURS AS A PROCESS OR SYSTEM AS OPPOSED TO CONSIDERATION OF "STAND ALONE" TREATMENTS AS MANY OF THE CONTRACTORS SEEM TO DO IN ASSESSING THE PROBLEM. IT SHOULD BE BORNE IN MIND THAT WE HAVE HAD THE REPORT LESS THAN A MONTH AND SAMPLES OF MATERIALS FROM THE SITE FOR LESS THAN A WEEK. OUR RESEARCHERS ARE CONTINUING TO DEVELOP DATA BUT, AT THIS POINT, MUCH OF WHAT WE SAY MUST BE VIEWED AS SPECULATIVE OR PRELIMINARY. WITH THAT IN MIND, WE WOULD LIKE TO OFFER A FEW COMMENTS.

1) THE BUREAU HAS HAD GOOD SUCCESS IN ESTABLISHING TECHNOLOGY INVOLVING THE USE OF WETLANDS TO ASSIST IN THE TREATMENT OF ACID MINE DRAINAGE. WE HAVE BEEN USING A VARIETY OF PLANTS, PRINCIPALLY MOSSES AND CATTAILS, TO REMOVE IRON, MANGANESE AND ALUMINUM FROM MINE DRAINAGE STREAMS. OUR EXPERIENCE TO DATE SUGGESTS THAT THESE METALS ARE REMOVED BY A NUMBER OF MECHANISMS IN THE WETLAND ECOSYSTEM. THERE APPEARS TO BE A STRONG SIMILARITY BETWEEN THIS SITUATION AND THE SITUATION AT THE MARATHON SITE WETLANDS. ACCORDING TO THE EBASCO REPORT (AND THEIR CITATION OF THE ACRES REPORT), THE CONTAMINANT METALS ARE LARGELY SEQUESTERED IN SEDIMENTS AND MARSH BIOTA. IT APPEARS THAT THE ECOSYSTEM IS PROVIDING SUFFICIENT CONTAINMENT TO MINIMIZE WATER POLLUTION. THE ENVIRONMENTAL PROBLEMS ARE THEN: (1) SEDIMENT MIGRATION BY TIDAL ACTION; (2) POSSIBLE DETRIMENTAL EFFECTS ON HIGHLY-VALUED NATURAL WETLANDS; AND (3) POSSIBLE DETRIMENTAL EFFECTS ON FISH AND SHELLFISH, PARTICULARLY THOSE OF HIGH ECOLOGICAL VALUE (RARE OR ENDANGERED SPECIES) AND THOSE USED FOR HUMAN CONSUMPTION.

IT MAY BE POSSIBLE TO DESIGN A REMEDIAL ACTION BASED ON THE FAVORABLE NATURAL ACTIVITY OF THE LOCAL WETLANDS. TO ILLUSTRATE THE POINT, WE HAVE SKETCHED OUT THREE SCENARIOS.

ONE SCENARIO WOULD CALL FOR CONSTRUCTION OF A BREAKWALL OR OTHER ENCLOSURE AROUND THE MOST CONTAMINATED SEDIMENT CHANNEL AREA (FOR EXAMPLE, THE EAST COVE HOTSPOT) AND CONSTRUCTION WITHIN OF AN ISOLATED PLANTING OF TYPHA OR OTHER SPECIES. THIS CONSTRUCTED WETLAND WOULD BE USED TO DELIBERATELY TRANSPORT METALS FROM THE SEDIMENTS TO THE VEGETATION. PERIODICALLY THE PLANTS WOULD BE HARVESTED AND ASHED FOR METAL RECOVERY. THE METALS COULD THEN BE DISPOSED OR RECYCLED. THIS APPROACH MEDIATES THE PROBLEM IN TWO WAYS, FIRST BY

PREVENTING FURTHER MIGRATION OF CONTAMINATED SEDIMENT TO THE HUDSON RIVER AND CONSTITUTION MARSH, AND SECOND BY REMOVING METALS FROM THE SYSTEM WITHOUT EXTENSIVE DISTURBANCE AND CONSEQUENT ENHANCED MOBILIZATION OF SEDIMENTS.

ANOTHER SCENARIO CALLS FOR THE SAME APPROACH OF CONSTRUCTING BARRIER WETLANDS, BUT AT THE PERIMETER OF THE PRESENTLY AFFECTED AREA. IN THIS CASE, THE OBJECT WOULD BE PRIMARILY TO CONTAIN THE CONTAMINATED SEDIMENTS. THE RELATIVELY LOW CONCENTRATION OF METALS IN THE PERIMETER SEDIMENTS WOULD PROBABLY PREVENT THE DEGREE OF BIOACCUMULATION NEEDED TO MEANINGFULLY REDUCE OVERALL METAL LOADING IN THE SYSTEM.

A THIRD SCENARIO BASED ON THE SAME CONCEPT WOULD BE TO USE THE EXISTING WETLANDS IN AN ACCELERATED GROWTH PHASE TO ENHANCE BIOACCUMULATION OF METALS IN THE PLANTS, FOLLOWED BY HARVESTING, ASHING, AND METAL RECOVERY. THE OBJECT IS TO INCREASE BIOLOGICAL UPTAKE, EITHER BY INTRODUCING MORE SUSCEPTIBLE PLANT SPECIES OR BY ENHANCING UPTAKE OF PRESENT SPECIES THROUGH FERTILIZATION OR OTHER MEANS TO ENCOURAGE RAPID GROWTH. THE CRITICAL FEATURE OF THIS PLAN IS THE HARVESTING OF METAL-LADEN PLANTS SO THAT METALS ARE NOT RECYCLED TO THE SEDIMENTS DURING DECAY.

NONE OF THESE APPROACHES OFFER THE SPEED OF REMEDIATION OFFERED BY OTHER CONTAMINANT REMOVAL/TREATMENT PLANS. HOWEVER, THEY MAY BE LESS ENVIRONMENTALLY INTRUSIVE IN THAT DISTURBANCE OF NATURAL MEDIATION PROCESSES AND DISRUPTION OF A HIGHLY-VALUED ECOSYSTEM WOULD BE MINIMIZED.

2) THE THERMAL TREATMENT SECTION OF THE FEASIBILITY STUDY (P 2-31) SEEMS TO HAVE FAILED TO RECOGNIZE THE STATE OF THE ART OF FURNACING CADMIUM-BEARING MATERIALS. THE AUTHORS NOTE THAT SOME OF THE HEAVY METALS (PRESUMABLY CADMIUM AND ANY MERCURY PRESENT) WOULD VOLATILIZE AND CONCLUDED THAT THERMAL TREATMENT WAS THEREFORE INFEASIBLE ON THE BASIS OF A PRESUMED AIR-POLLUTION PROBLEM. THE COMMERCIAL TECHNOLOGY FOR THE RECOVERY OF CADMIUM FROM ZINC AND OTHER ASSOCIATED METALS RELIES ON THIS TEMPERATURE SENSITIVITY. THE CADMIUM IS VOLATILIZED AND CONDENSED FOR RECOVERY. THE POINT IS THAT THERE IS WELL-ESTABLISHED TECHNOLOGY FOR DEALING WITH THIS AND THE VOLATIZATION OF CADMIUM SHOULD NOT BE A REASON FOR CONCLUDING THAT THE TECHNOLOGY IS INFEASIBLE.

THE ASSESSMENT PRESENTED ALSO EXHIBITS A LACK OF CONSIDERATION OF WAYS IN WHICH THERMAL TREATMENT COULD BE COMBINED WITH OTHER TECHNIQUES (SUCH AS LEACHING OF THE RESIDUE) AS PART OF AN OVERALL SYSTEM OF METAL REMOVAL. UNLIKE THE APPLICATION THE CONTRACTOR WAS PROBABLY MORE FAMILIAR WITH -- THERMAL DESTRUCTION OF ORGANIC CONTAMINANTS -- THERMAL TREATMENT OF INORGANIC CONTAMINANTS MAKES LITTLE SENSE AS A "STAND ALONE" SOLUTION.

3) THE SECTION ON CHEMICAL TREATMENT DESCRIBES THE RESULTS OF EFFORTS TO LEACH THE METALS USING A HYDROCHLORIC ACID SOLUTION. THE NATURE OF THE HOST MATERIAL SUGGESTED TO OUR RESEARCHERS THAT BETTER RESULTS COULD HAVE BEEN OBTAINED HAD AN OXIDANT BEEN COMBINED WITH HYDROCHLORIC OR OTHER ACID OR HAD A DIFFERENT ACID BEEN CHOSEN. IN THE SHORT TIME THAT WE HAVE HAD SAMPLES OF THE MATERIAL WE WERE ABLE TO BEGIN SOME SCREENING TRIALS USING, IN ONE CASE, A COMBINATION OF FERRIC SULFATE AND SULFURIC ACID AND, IN ANOTHER, TARTARIC AND ACETIC ACIDS. WHILE WE DO NOT HAVE THE COMPLETE RESULTS OF THESE TRIALS AT THE MOMENT, IT APPEARS BOTH MAY PRODUCE BETTER RESULTS THAN THE RESULTS REPORTED TO YOU.

EARLIER BUREAU RESEARCH, DESCRIBED IN REPORT OF INVESTIGATION 7566, DEALT WITH THE RECOVERY OF CADMIUM AND NICKEL FROM THE SAME TYPE OF BATTERY SCRAP THAT LEAD TO THE CONTAMINATION PROBLEM YOU FACE. THE BUREAU RESEARCHERS DEVELOPED A PROCESS INVOLVING ROASTING (THERMALLY TREATING) AND LEACHING WITH AMMONIUM NITRATE THAT RECOVERED BETTER THAN 90% OF THE METALS. UNFORTUNATELY, WE DO NOT HAVE SPECIATION DATA ON THE METALS FROM THE MARATHON SITE THAT WOULD ALLOW US TO TELL WHETHER THE FORMS OF METAL ARE THE SAME. MY POINT IN MENTIONING THIS RELATES RATHER TO THE POSSIBLE BENEFITS OF COMBINATIONS OF APPROACHES I NOTED ABOVE.

4) THE SECTION ON BIOLOGIC TREATMENT APPEARS TO HAVE APPROACHED THE PROBLEM STRICTLY FROM THE STANDPOINT OF TREATMENT OF ORGANIC MATERIALS AS WITNESSED BY THE USE OF THE TERM "BIODEGRADATION". THERE ARE BIOLOGIC TECHNOLOGIES APPLICABLE TO INORGANIC MATERIALS, BUT THEY DO NOT INVOLVE BIODEGRADATION. WHILE BIODEGRADATION MAY HAVE RELEVANCE TO SOME SORT OF TREATMENT OF THE SUPERNATANT WATER FOR PURPOSES UNRELATED TO THE METALS, THE MORE RELEVANT CONSIDERATIONS -- THE ASSESSMENT OF BIOLEACHING OR BIOSORBTION OF THE INORGANIC MATERIALS -- IS NOT EVEN MENTIONED. IN PRINCIPLE, THIS COULD PRESENT AN ATTRACTIVE, LOW-COST TREATMENT OPTION.

AS I NOTED AT THE START OF THE LETTER, OUR INTEREST WAS MORE IN THE ASSESSMENT METHODOLOGY AS IT RELATES TO TREATMENT OPTIONS (FOR REASONS TIED TO OUR PROGRAMMATIC INTERESTS) RATHER THAN IN A DETAILED CRITIQUE OF YOUR CONTRACTOR'S EFFORTS. WHILE IT APPEARS CLEAR TO US THAT THERE ARE TECHNICALLY-FEASIBLE TREATMENT OPTIONS (OTHER THAN FIXATION), WE HAVE NO DESIRE TO HAVE THIS CONCLUSION INTERFERE WITH WHAT WE RECOGNIZE AS EPA'S INTEREST IN MOVING EXPEDITIOUSLY TO CLEAN UP THE MARATHON SITE. THE FACT THAT THERE ARE OTHER OPTIONS IN NO WAY INDICATES THAT THESE OPTIONS ARE "BETTER" FOR EPA THAN THE ONES OUTLINED BY THE CONTRACTOR. WE DID SOME VERY PRELIMINARY ORDER-OF-MAGNITUDE COST ASSESSMENTS OF METALLURGICAL-TYPE TREATMENT AND THOSE ANALYSES SUGGEST THAT, FOR THIS MATERIAL, UNDER THE CONDITIONS DESCRIBED, OUR SORT OF TREATMENT WOULD BE MORE COSTLY THAN FIXATION.

I DO NOT KNOW IF ANY OF THE ABOVE IS OF INTEREST TO EPA IN EITHER THE SHORT- OR LONG-RUN SENSE. IF THERE IS AN INTEREST, PERHAPS IT WOULD MAKE SENSE TO CONTINUE SOME LEVEL OF BUREAU INVESTIGATION IN PARALLEL WITH YOUR DESIGN STUDY. IN ANY CASE, ONE SUGGESTION THAT WE WOULD LIKE TO MAKE IS FOR A MEETING BETWEEN SOME OF OUR PEOPLE, EPA REPRESENTATIVES, THE CONTRACTOR'S TECHNICAL PERSONNEL AND OTHER INTERESTED PARTIES SUCH AS THE STATE TO DISCUSS TREATMENT OPTIONS IN MORE DETAIL. WE BELIEVE THAT SUCH A MEETING WOULD BENEFIT EPA IN ITS DELIBERATIONS ON OTHER PARTS OF THE MARATHON SITE AND ON OTHER SITES IN THE REGION. WE KNOW THAT OUR PEOPLE WOULD BENEFIT FROM A BETTER UNDERSTANDING OF THE REALITIES OF SITE CLEANUP DECISION MAKING. I WILL CALL YOU NEXT WEEK TO ASK IF SUCH A MEETING WOULD BE OF INTEREST TO YOU.

SINCERELY,

WILLIAM B. SCHMIDT

CC: MR. N. NOSENCHUCK.

VINSON & ELKINS

SEPTEMBER 22, 1986

MR. JOEL SINGERMAN
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

RE: MARATHON BATTERY COMPANY SITE
COLD SPRING, NEW YORK

DEAR MR. SINGERMAN:

IN ACCORDANCE WITH THE SEPTEMBER 23, 1986 EXTENDED DEADLINE OF EPA REGION II, MARATHON BATTERY COMPANY AND GOULD INC. SUBMIT THE ENCLOSED COMMENTS, PREPARED BY ERT, INC., ON THE PHASE I REMEDIAL INVESTIGATION FEASIBILITY STUDY (RI/FS) ON THE REFERENCED SITE, PREPARED FOR THE AGENCY BY ITS CONSULTANT, EBASCO.

MARATHON AND GOULD, THOUGH SUBMITTING THESE COMMENTS, ARE NOT LIABLE AND ARE NOT ADMITTING LIABILITY UNDER SUPERFUND OR ANY OTHER STATUTES FOR ANY REMEDIATION OF THE SITE. IN 1971, EPA REGION II HAD SUED MARATHON AND GOULD, AMONG OTHERS, SEEKING RELIEF FOR PRECISELY THE SAME ACTIVITIES THAT HAVE GIVEN RISE TO THE CURRENT INVESTIGATION. IN ACCORDANCE WITH THE CONSENT DECREE ENTERED BY THE PARTIES IN THAT LITIGATION, THE DEFENDANTS, INCLUDING MARATHON AND GOULD, PERFORMED DREDGING AND OTHER REMEDIATION ACTIVITIES, INCLUDING ONSITE DISPOSAL, PRESCRIBED BY THE EXPERT ADVISING THE COURT. THE GOVERNMENT, ON BEHALF OF EPA, FILED A SATISFACTION OF JUDGMENT AND RELEASED THE DEFENDANTS FROM ANY CLAIMS BASED IN ANY WAY ON THE DISCHARGE OF INDUSTRIAL WASTE FROM THE PLANT.

MARATHON AND GOULD APPRECIATE THE EIGHT-DAY EXTENSION GRANTED BY THE AGENCY AND THE OPPORTUNITY AFFORDED THE TWO COMPANIES AND MERCHANDISE DYNAMICS AND THE ARMY CORPS OF ENGINEERS, OTHER POTENTIALLY RESPONSIBLE PARTIES (PRPS), TO MEET WITH EPA AND EBASCO ON SEPTEMBER 18, 1986 TO DISCUSS THE RI/FS. AS NOTED IN THAT MEETING, HOWEVER, MARATHON AND GOULD DO NOT BELIEVE AN ADEQUATE OPPORTUNITY TO PREPARE MEANINGFUL COMMENTS HAS BEEN PROVIDED.

MARATHON AND GOULD RECEIVED THE RI/FS ON AUGUST 25, 1986, THE DAY BEFORE THE PUBLIC HEARING ON THE RI/FS. THE INFORMATION DISTRIBUTED AT THAT HEARING INDICATED A 30-DAY COMMENT PERIOD WAS BEING PROVIDED, YET MARATHON AND GOULD DID NOT RECEIVE THE RI/FS UNTIL TEN DAYS AFTER IT HAD BEEN MADE PUBLICLY AVAILABLE, THIS DESPITE THE FACT THAT EPA HAD NOTIFIED THE COMPANIES THAT THEY WERE PRPS AND THAT THE COMPANIES PREVIOUSLY HAD BEEN IN CONTACT WITH THE AGENCY TO DETERMINE THE STATUS OF THE INVESTIGATION. MARATHON, IN FACT, HAD RETAINED ERT TO SPLIT SAMPLES WITH THE AGENCY'S CONSULTANTS AND HAD SUBMITTED TO THE AGENCY IN AUGUST OF 1983, A REPORT PREPARED FOR IT BY REI, WHO SUBSEQUENTLY ACQUIRED ERT, WHICH WAS RELIED ON BY BOTH ACRES AND EBASCO IN THE PREPARATION OF THEIR REPORTS. THE EIGHT-DAY EXTENSION IS HELPFUL, BUT STILL PROVIDES AN INADEQUATE OPPORTUNITY TO EVALUATE PROPERLY THE RI/FS AND TO PREPARE COMMENTS.

ALTHOUGH THE ARMY CORPS OF ENGINEERS APPARENTLY HAD SUBMITTED CURSORY COMMENTS ON THE RI/FS AS CONSULTANT TO EPA, THE CORPS INDICATED, AT THE SEPTEMBER 18, 1986 MEETING, THAT AT LEAST 30 DAYS WOULD BE NECESSARY FOR THEIR FULL TECHNICAL REVIEW AS A PRP, ONCE THEY HAD COMPLETED THEIR INVENTORY AND DETERMINED WHETHER THEY HAD ANY RESPONSIBILITY FOR THE SITE. BECAUSE THE CORPS PERFORMS TECHNICAL REVIEWS AND MANAGES SUPERFUND CLEANUPS FOR EPA AND BECAUSE THE CORPS IS THE AGENCY WITH JURISDICTION OVER DREDGING, THE CORPS' SPECIAL EXPERTISE AND EXPERIENCE SHOULD BE UTILIZED PRIOR TO THE PREPARATION OF THE RECORD OF DECISION. MARATHON AND GOULD BELIEVE THE COMMENT PERIOD SHOULD BE EXTENDED TO ALLOW THE CORPS TO SUBMIT ITS COMMENTS AND THAT THE TWO COMPANIES, LIKEWISE, SHOULD BE GIVEN ADDITIONAL TIME TO SUBMIT MORE COMPLETE AND DETAILED COMMENTS. AS NOTED AT THE MEETING, THE COMPANIES WOULD LIKE TO OBTAIN COPIES OF THE COMMENTS SUBMITTED BY THE CORPS AND OTHERS ON THE RI/FS DOCUMENTS. UNDER SEPARATE LETTER, WE ARE FILING AN FOIA REQUEST FOR PERTINENT DOCUMENTS.

THE 1983 REI REPORT, WHICH MARATHON SUBMITTED, WAS ENTITLED, "PRELIMINARY SITE BACKGROUND DATA ANALYSIS" AND PRESENTED A HISTORY OF SITE OPERATIONS AND AN ALLOCATION OF THE TOTAL AMOUNT OF CADMIUM ATTRIBUTABLE TO OPERATIONS OF THE VARIOUS OWNERS/OPERATORS OF THE SITE. TO INSURE THAT THIS DOCUMENT IS PART OF THE AGENCY

RECORD, A COPY IS ENCLOSED AS PART OF THIS SUBMISSION.

FINALLY, SO THAT THE AGENCY'S RECORDS ARE CORRECT, PLEASE NOTE THAT MARATHON BATTERY COMPANY IS A DELAWARE CORPORATION.

MARATHON AND GOULD APPRECIATE THE COOPERATION OF THE AGENCY IN ARRANGING A MEETING WITH IT AND ITS CONSULTANTS ON SEPTEMBER 18TH. WE LOOK FORWARD TO MEETING WITH THE REGION AGAIN ON OCTOBER 3RD AND TO WORKING WITH THE AGENCY TO SUCCESSFULLY RESOLVE THIS MATTER.

SINCERELY,

VINSON & ELKINS

BY
JEFF CIVINS
COUNSEL FOR MARATHON
BATTERY COMPANY

GOULD INC.

BY
MICHAEL C. VEYSEY
ASSISTANT GENERAL
COUNSEL

JC:SG
ENCLOSURES
CC: BEVERLY KOLENBERG
(WITH ENCLOSURES)
DAN TRAVIS - USACE
DAVE PALMER - USACE
JOSEPH MUNOZ - USACE.

COMMENTS OF THE MARATHON BATTERY COMPANY AND
GOULD INCORPORATED ON THE SUPPLEMENTAL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY OF
THE MARATHON BATTERY SUPERFUND SITE
COLD SPRING, NEW YORK

SEPTEMBER 23, 1986

PREPARED BY:
ERT, A RESOURCE ENGINEERING COMPANY
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8739P PE-340

INTRODUCTION

BY AUGUST 22, 1986 LETTERS, EPA REGION II PROVIDED COPIES OF THE PHASE I SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR THE REFERENCED SITE TO MARATHON BATTERY COMPANY AND GOULD INC., AS NAMED POTENTIALLY RESPONSIBLE PARTIES (PRPS). THE LETTERS, WHICH WERE RECEIVED ON AUGUST 25, 1986, REQUIRED THE COMPANIES TO PROVIDE ANY COMMENTS ON THE TWO VOLUME RI/FS TO THE AGENCY BY SEPTEMBER 15, 1986. MARATHON RETAINED ERT TO PREPARE COMMENTS ON ITS BEHALF AND BY AUGUST 29, 1986 LETTER, REQUESTED AN EXTENSION OF THE COMMENT PERIOD UNTIL OCTOBER 1, 1986. AS CONFIRMED BY A SEPTEMBER 3, 1986 LETTER, EPA GRANTED AN EXTENSION OF TIME UNTIL SEPTEMBER 23, 1986. MARATHON AND GOULD THEREAFTER AGREED THAT ERT SHOULD PREPARE ITS COMMENTS ON BEHALF OF BOTH COMPANIES.

AS NOTED IN THE SEPTEMBER 19, 1986 MEETING OF REPRESENTATIVES OF THE NAMED PRPS, ERT, AND EPA AND ITS CONSULTANTS, THESE COMMENTS ARE BEING PREPARED HURRIEDLY TO MEET THE SEPTEMBER 23, 1986 DEADLINE. AS A CONSEQUENCE, THESE COMMENTS ARE NEITHER DETAILED NOR COMPLETE. THE PURPOSE OF THESE COMMENTS IS TO SET OUT FOR THE AGENCY AND ITS CONSULTANTS, THE IMMEDIATE CONCERNS OF MARATHON AND GOULD, SO THAT THOSE CONCERNS MAY BE ADDRESSED IN THE RECORD OF DECISION (ROD). IN THE EVENT ADDITIONAL TIME FOR COMMENT IS PROVIDED, MARATHON AND GOULD HAVE REQUESTED THAT ERT SUPPLEMENT THESE COMMENTS WITH MORE DETAILED AND COMPLETE INFORMATION. MARATHON AND GOULD EXPRESSLY RESERVE AND DO NOT WAIVE ANY AND ALL RIGHTS THE COMPANIES MAY HAVE REGARDING THIS MATTER.

THE FINDINGS OF THE ERT REVIEW THAT WILL BE DEVELOPED ARE THE FOLLOWING:

- THE RI/FS FAILS TO ADEQUATELY CONSIDER THE RISK OF ENVIRONMENTAL HARM ASSOCIATED WITH THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION, INCLUDING EPA'S PREFERRED ALTERNATIVE OF DREDGING EAST COVE MARSH AND EAST COVE.

- THE RI/FS FAILS TO ADEQUATELY DEMONSTRATE THAT THE SITE POSES A THREAT TO HUMAN HEALTH OR THE ENVIRONMENT REQUIRING REMEDIATION.

- THE RI/FS PROVIDES NO JUSTIFICATION FOR THE DECONTAMINATION OBJECTIVE OF 100 PPM CADMIUM.

- THE RI/FS FAILS TO ADEQUATELY EVALUATE THE VIABILITY OF TREATMENT OPTIONS AND THEIR ENVIRONMENTAL CONSEQUENCES.

- THE RI/FS PREMATURELY ELIMINATES POTENTIAL REMEDIAL OPTIONS THAT ARE ENVIRONMENTALLY PREFERABLE AND MORE COST EFFECTIVE THAN THE EPA'S PREFERRED ALTERNATIVES.

THE RI/FS FAILS TO ADEQUATELY CONSIDER THE RISK OF ENVIRONMENTAL HARM ASSOCIATED WITH THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION, INCLUDING EPA'S PREFERRED ALTERNATIVE OF DREDGING EAST COVE MARSH AND EAST COVE

IN DEVELOPING AND EVALUATING REMEDIAL ALTERNATIVES, THE SENSITIVITY OF THE ECOSYSTEM IS OF CRITICAL

IMPORTANCE. THE RI/FS RECOGNIZES THAT:

"THE MARSH AREAS OF EAST FOUNDRY COVE AND CONSTITUTION MARSH ARE DELICATE ECOLOGICAL HABITATS WHICH ARE DWINDLING VITAL HABITATS IN THE HUDSON RIVER ESTUARY. ANY PERTURBATIONS OF ANY SECTION OF THE EXISTING WETLANDS COULD HAVE DRASTIC ECOLOGICAL EFFECTS ON THE PRESENT FLORA AND FAUNA. ANY REMEDIAL ACTIONS MUST MINIMIZE THE DISTURBANCE TO THE WETLANDS TO ENSURE THAT NO SIGNIFICANT ADVERSE ECOLOGICAL EFFECTS WILL OCCUR" (PAGE 8-41, EBASCO, 1986A) (EMPHASIS ADDED).

DESPITE THIS RECOGNITION, THE RI/FS PROPOSES REMEDIAL ALTERNATIVES THAT THREATEN THE EXISTENCE OF THE ECOSYSTEM WITHOUT ADEQUATELY CONSIDERING THE RISK OF ENVIRONMENTAL HARM ASSOCIATED WITH THOSE ALTERNATIVES. IN THE AUGUST 26, 1986 PUBLIC MEETING, EPA INDICATED ITS PREFERRED ALTERNATIVE INVOLVED THE DREDGING OF EAST FOUNDRY COVE MARSH. THIS ALTERNATIVE ENTAILS THE COMPLETE DESTRUCTION OF THE MARSH. NOTABLY, ARGUMENTS PERTAINING TO THE SENSITIVE ECOSYSTEM PRESENTED TO RECOMMEND "NO ACTION" IN CONSTITUTION MARSH WERE REVERSED TO JUSTIFY INTENSIVE CLEAN-UP OF EAST FOUNDRY COVE MARSH.

THE POTENTIAL ADVERSE EFFECTS OF THE PREFERRED ALTERNATIVE ARE DISCOUNTED BECAUSE THE RI/FS CONTEMPLATES THAT EAST FOUNDRY COVE MARSH WILL BE REVEGETATED. NEITHER THE RISK NOR THE CONSEQUENCES OF FAILURE OF THIS REVEGETATION TECHNOLOGY ARE CONSIDERED.

SECTION 6.2.2.1 OF THE GUIDANCE MANUAL ON FEASIBILITY STUDIES (EPA, 1985) STATES:

"THE USER SHOULD IDENTIFY AND EVALUATE ANY EXPECTED ADVERSE EFFECTS OF REMEDIAL CONSTRUCTION AND OPERATIONS. IN IDENTIFYING THESE EFFECTS, THE USER SHOULD ESPECIALLY CONSIDER SENSITIVE ENVIRONMENTAL AREAS AND RESOURCES PEOPLE USE. THE USER SHOULD DISTINGUISH INEVITABLE EFFECTS FROM POSSIBLE ONES, SO THAT THE EVALUATION OF ALTERNATIVES CAN ESTIMATE THE PROBABILITY OF EXPECTED ADVERSE EFFECTS. EQUALLY IMPORTANT IS RECOGNIZING THAT SOME EFFECTS ARE IRREVERSIBLE. THE USERS SHOULD STATE THAT EFFECTS ARE REVERSIBLE OR IRREVERSIBLE IF THEY ARE SIGNIFICANT.". (EMPHASIS ADDED.).

THE RI/FS CONTAINS NO DISCUSSION OF THE PROBABILITY OF AN ADVERSE EFFECT IF REVEGETATION SHOULD PROVE UNSUCCESSFUL. IN A SEPTEMBER 18, 1986 MEETING, THE AGENCY AND ITS CONSULTANTS NOTED THERE WAS SOME RISK OF FAILURE, THOUGH THEY BELIEVED IT TO BE SMALL. THAT RISK, HOWEVER, IS NOT REFERENCED IN THE RI/FS.

THE CONCEPT OF RISK MITIGATION BY REVEGETATION IS BASED ON THE WORK OF ENVIRONMENTAL CONCERN, INC., THE FIRM THAT DEVELOPED THE PRELIMINARY PLAN FOR REVEGETATION. A REPRESENTATIVE OF ENVIRONMENTAL CONCERN PROVIDED INFORMATION SUGGESTING SOME POTENTIAL CONCERNS REGARDING THE REVEGETATION THAT WERE NOT ADDRESSED IN THE RI/FS:

- THE FIRM HAS LIMITED PAST EXPERIENCE WITH BRACKISH-WATER TIDAL MARSH REVEGETATION.
- OF THE CATTAILS AND ARROW ARUM TO BE PLANTED, CATTAILS TEND TO SPREAD FASTER. AS THE ARROW ARUM IS CURRENTLY THE DOMINANT PLANT IN THE MARSH, THIS COULD MEAN A CHANGE IN THE ECOLOGICAL NATURE OF THE MARSH.
- PART OF THE REVEGETATION PLAN IS TO REPLACE EXCAVATED SOILS WITH CLEAN SOILS, WHICH MAY CHANGE THE NATURE OF THE SOILS FROM ORGANIC TO MINERAL. THE MINERAL NATURE OF THE NEW SOILS MAY BE PERPETUATED BY THE FASTER SPREAD OF CATTAILS, AS THE ARROW ARUM IS THE MAJOR CONTRIBUTOR OF ORGANIC MATTER OF THE TWO PLANTS.
- CONSTANT MAINTENANCE AND HAND-CUTTING WILL BE REQUIRED FOR AT LEAST ONE TO TWO YEARS TO PREVENT THE INVASION AND/OR ESTABLISHMENT OF PURPLE LOOSESTRIFE, AN AGGRESSIVE PLANT THAT HAS NO FOOD VALUE FOR WILDLIFE.

IN ADDITION TO IGNORING THE RISK THAT REVEGETATION OF EAST FOUNDRY COVE MARSH MIGHT BE UNSUCCESSFUL, THE RI/FS FAILS TO CONSIDER THE IMPACT ON CONSTITUTION MARSH OF REMEDIAL ACTIONS IN EAST FOUNDRY COVE AND EAST FOUNDRY COVE MARSH. THERE IS A POTENTIAL FOR ADVERSE EFFECTS IN CONSTITUTION MARSH RESULTING FROM DISTURBANCE OF FLOW PATTERNS DURING AND SUBSEQUENT TO THE PROPOSED DIKE CONSTRUCTION AND DREDGING PROGRAM ELSEWHERE AT THE SITE.

THE NATIONAL CONTINGENCY PLAN (NCP) REQUIRES THAT THERE BE AN ANALYSIS OF THE REMEDIAL ALTERNATIVES TO IDENTIFY:

- ! ANY ADVERSE ENVIRONMENTAL IMPACTS,
- ! METHODS FOR MITIGATING THESE IMPACTS, AND
- ! COSTS OF MITIGATION.

(SEE 50 FED. REG. 47975, (NOVEMBER 20, 1985) TO BE CODIFIED AT 40 C.F.R. SS300.68(H)(2)(VI).). THIS THE RI/FS HAS FAILED TO DO. THE POSSIBILITY THAT DREDGING MIGHT RESULT IN MORE HARM TO THE ECOSYSTEM THAN AN ALTERNATIVE REMEDIAL RESPONSE IS NOT ADEQUATELY ADDRESSED. SEE 50 FED. REG. 47921 (NOV. 20, 1985):

"EXCEPTIONS TO COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS: UNACCEPTABLE ENVIRONMENTAL IMPACTS: IN SOME CASES, IT MIGHT BE POSSIBLE TO MEET APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL REQUIREMENTS, BUT COMPLIANCE MIGHT RESULT IN SIGNIFICANT ADVERSE ENVIRONMENTAL IMPACTS. THIS MIGHT BE THE CASE, FOR EXAMPLE, WHEN DREDGING CONTAMINANTS FROM THE BOTTOM OF A BODY OF WATER TO LEVELS REQUIRED BY ENVIRONMENTAL STANDARDS WOULD RESULT IN MORE HARM TO THE ECOSYSTEM THAN AN ALTERNATIVE REMEDIAL RESPONSE.". (EMPHASIS ADDED).

FAILURE TO CONSIDER THESE POTENTIAL IMPACTS IS NOT ONLY INCONSISTENT WITH THE NCP, IT CREATES THE POSSIBILITY OF AN OVERSIGHT OF AN ENVIRONMENTAL IMPACT WITH A HIGH PROBABILITY OF OCCURRENCE. THIS OVERSIGHT COULD, IN FACT, RESULT IN THE OMISSION OF THE "NO ACTION ALTERNATIVE" AS THE PREFERRED REMEDIAL PLAN FOR THE ENTIRE SITE UNDER NCP GUIDANCE.

THE RI/FS FAILS TO ADEQUATELY DEMONSTRATE THAT THE SITE POSES A THREAT TO HUMAN HEALTH OR THE ENVIRONMENT REQUIRING REMEDIATION

HUMAN HEALTH

THE RI INDICATES THAT A REMEDIAL ACTION IS WARRANTED BASED ON BOTH FINDINGS DETAILED IN THE DOCUMENT, AND THE WORK OF OTHER INVESTIGATORS (KNEIP AND O'CONNOR, 1979).

THE KNEIP AND O'CONNOR ASSESSMENT CONCERNED THE HEALTH RISK OF EATING CRABS. THE HIGHLIGHTS OF THAT ASSESSMENT ARE:

- ! THE AUTHORS PRESUMED THAT 10 CRABS PER WEEK WERE EATEN FOR 20 WEEKS EACH YEAR, THE MAXIMUM CONSUMPTION REPORTED IN A POLL OF 72 HOUSEHOLDS.
- ! THE AUTHORS PRESUMED THAT MUSCLE AND HEPATOPANCREAS WERE EATEN, WHEREAS ONLY 4% OF THE POPULATION POLLED (3/72) INDICATED THAT THEY INGESTED HEPATOPANCREAS. THIS ORGAN ACCUMULATES CADMIUM TO THE EXTENT THAT, IN THE ASSESSMENT, IT REPRESENTED 50% OF THE CADMIUM OBTAINED FROM THE FLESH.
- ! THE TISSUE BURDEN ASSUMED FOR ALL CRABS INGESTED WAS EXTRAPOLATED FROM ANALYTICAL FINDINGS IN 2 SAMPLES TAKEN IN 1976.
- ! THE INTAKE FROM THIS SCENARIO WAS COMPARED TO INTAKE LIMITS BASED ON PREVENTING CHRONIC KIDNEY INJURY (COMPARISON OF THE INTAKE TO LIMITS DEVELOPED TO PREVENT ACUTE GASTROINTESTINAL EFFECTS OF CADMIUM REVEALED NO RISK).

AN AUTHOR OF THIS INVESTIGATION (DR. THEODORE KNEIP, N.Y.U. MEDICAL SCHOOL) WAS CONTACTED AND INDICATED THAT THIS ASSESSMENT WAS A PRELIMINARY STUDY, UNINTENDED FOR REGULATORY PURPOSES. DR. KNEIP'S COMMENTS ARE ATTACHED TO THIS REPORT. THE KNEIP AND O'CONNOR SCENARIO MAY NOT BE REASONABLE, EVEN AS A WORST CASE, FOR THE FOLLOWING REASONS:

- ! THE CADMIUM CONCENTRATION FOR 1976 THORACIC CRAB TISSUE USED IN THE RISK ASSESSMENT IS HIGHER

THAN ANY OF THE SAMPLES REPORTED SUBSEQUENTLY IN ACRES, 1985 OR SLOAN AND KARCHER, 1984 (SEE TABLE 1) OR FOR THE CRABS COLLECTED BY KNEIP AND O'CONNOR IN 1978. THIS MAY HAVE BEEN CAUSED BY CONTAMINATING THE THORACIC MUSCLE WITH HIGH CADMIUM HEPATOPANCREAS WHEN PREPARING THE TISSUE FOR ANALYSIS (HAZEN, 1981). THE EFFECT OF THIS IS TO OVERESTIMATE THE WORST CASE INTAKE OF CADMIUM, ALTHOUGH THE EXTENT OF THE OVERESTIMATION CANNOT BE CALCULATED (DUE TO THE FACT THAT THE RELATIVE CONTRIBUTIONS OF EACH ORGAN TO THE TOTAL INTAKE IS NOT GIVEN IN THE KNEIP AND O'CONNOR RISK ASSESSMENT).

- EVEN IF ONE ACCEPTS THE HIGH VALUES FROM THE 1976 CRABS, NO RISK WAS INDICATED USING THE SAME METHOD WITH THE LOWER CADMIUM CONCENTRATION FOUND IN CRABS COLLECTED IN 1978. BECAUSE THE TOXICITY LIMITS USED IN THE ASSESSMENT ARE FOR CHRONIC EXPOSURE, ONE MUST BELIEVE UNACCEPTABLE INTAKE IS SUSTAINED FOR MANY YEARS FOR RISK TO BE ENCOUNTERED. THE 1978 DATA IN KNEIP AND O'CONNOR (1979) INDICATE THAT THERE IS NO SUSTAINED INTAKE EXPOSURE.

- THE 200 CRAB INGESTION RATE IS FOR A "GOOD" YEAR (KNEIP AND O'CONNOR 1979). IN MANY YEARS THIS MANY CRABS CANNOT BE CAUGHT. IN FACT, KNEIP AND O'CONNOR WERE NOT ABLE TO OBTAIN ANY SAMPLES FROM FOUNDRY COVE IN 1977 DUE TO A SEVERE DECREASE IN THE CRAB POPULATION THROUGHOUT THE NEW YORK AND NEW JERSEY AREA, POSSIBLY RELATED TO COLD WEATHER. THIS AGAIN SUGGESTS THAT INTAKE CANNOT BE SUSTAINED AT TOXIC LEVELS.

THE RI ASSESSMENT UTILIZED MODELS FOR CADMIUM INTAKE VIA HUMAN INGESTION OF VARIOUS BIOTA PRESENT IN THE FOUNDRY COVE AREA (CRABS, FISH, DUCKS). THE LIKELIHOOD OF HUMAN HEALTH RISK WAS ASSESSED BY MONTE CARLO SIMULATION OF THE POSSIBILITY OF EXCEEDING A CHRONIC INTAKE LIMIT WITHIN PLAUSIBLE RANGES OF EXPOSURE PARAMETERS SUCH AS BIOTA INGESTION RATE, HUMAN CADMIUM BURDEN FROM OTHER SOURCES, AND PHYSICAL CONSTANTS RELATING SEDIMENT CONCENTRATION TO BIOTA CONCENTRATION. THE AGENCY AND ITS CONSULTANTS CONCLUDE THAT A SIGNIFICANT HEALTH RISK EXISTS FOR FISH AND CRAB INGESTION FROM FOUNDRY COVE IN ITS PRESENT CONDITION. HOWEVER, THE RI INDICATES THAT THE FISH MODEL CANNOT BE VALIDATED BY FIELD OBSERVATIONS. FISH TAKEN FROM THE FOUNDRY COVE AREA HAVE CADMIUM CONCENTRATIONS AT LEAST 10-FOLD, AND USUALLY ORDERS OF MAGNITUDE LOWER THAN THAT PREDICTED BY THE RI MODEL (PG 8-37, EBASCO 1986A). ANALYSIS OF THE CRAB MODEL WAS NOT DONE IN THE RI, BUT BASED ON THE ATTACHED INFORMATION FROM DR. KNEIP CONCERNING THE PARTITIONING OF CADMIUM INTO CRABS. IT IS UNLIKELY THAT THIS EXPOSURE PATHWAY MODEL IS ANY MORE VALID THAN THE FISH MODEL. A HUMAN HEALTH HAZARD CANNOT BE DEMONSTRATED USING A MODEL WHICH IS NOT VALID.

THE DEVELOPMENT OF A DECONTAMINATION GOAL TO PROTECT PUBLIC HEALTH UTILIZED THE FISH INGESTION MODEL. THE RI SUGGESTS THAT THE ERROR IN THE MODEL CAN BE COMPENSATED BY INCREASING THE ACCEPTABLE LEVEL OF RISK IN THE ANALYSIS. BY DOING THIS, THE RI ESTABLISHED A 900 PPM DECONTAMINATION GOAL FOR CADMIUM. THIS VALUE IS EQUIVALENT TO THE ONE ESTABLISHED FOR THE DREDGING REMEDIATION IN 1972. CHANGING THE ACCEPTABLE RISK LEVEL DOES NOTHING TO CORRECT THE MODEL, AND THE DECONTAMINATION GOAL DERIVED IN THIS MANNER IS NOT DEFENSIBLE. THE RI RELIES ON SIMULATIONS WHICH ARE NOT SUPPORTED BY MEASURED DATA FROM THE SITE TO SUPPORT ITS CONTENTION THAT A HEALTH RISK EXISTS AND TO DEVELOP A DECONTAMINATION GOAL. AN ALTERNATIVE HEALTH RISK ASSESSMENT IN KEEPING WITH RECENT EPA GUIDANCE (EPA. 1986) ON EXPOSURE ASSESSMENT THAT STATES THAT MEASURED DATA IS PREFERABLE TO SIMULATION, SHOULD BE USED.

USING INGESTION RATES DEVELOPED IN THE RI:

CRAB INGESTION = .0005 TO 0.1 KG FLESH/DAY
(ONE CRAB PER YEAR TO TEN CRABS PER WEEK FOR 20 WEEKS AT 195 G MEAT PER CRAB).

AND TOXICITY VALUES (ACCEPTABLE DAILY INTAKE, ADI) ALSO DEVELOPED IN THE RI:

ADI FOR CADMIUM = .2 MG/DAY - .05 MG/DAY = 0.15 MG/DAY
FROM CRAB INGESTION (MAXIMUM CADMIUM BURDEN FROM OTHER SOURCES).

THE CADMIUM CONCENTRATION WHICH WOULD MEET ACCEPTABLE CHRONIC LIMITS IN EDIBLE MEAT WOULD BE:

(.15 MG CD/DAY) / (0.0005 TO 0.1 G FLESH/DAY) = 1.5 TO 300 MG CADMIUM/KG FLESH.

THE LOW END OF THIS LIMIT, 1.5 MG/KG HAS NOT BEEN EXCEEDED IN ANY "EDIBLE FLESH" (LEG, CLAW OR THORACIC MUSCLE) ANALYZED FROM THE FOUNDRY COVE AREA SUBSEQUENT TO THE KNEIP AND O'CONNOR STUDY IN 1979 (TABLE 1). HEPATOPANCREAS EXCEEDS THIS LIMIT NOT ONLY IN THE FOUNDRY COVE AREA, BUT ALSO IN OTHER LOCATIONS UNAFFECTED BY FOUNDRY COVE CONTAMINATION (TABLE 1).

AN EQUIVALENT CALCULATION MAY BE DONE FOR FISH INGESTION. USING THE RI VALUE FOR FISH INGESTION RATE:

FISH INGESTION = .0003 TO .066 KG FLESH/DAY
(ONE 4 OZ. FILLET PER YEAR TO 10 TIMES THE EPA-ESTIMATED AVERAGE CONSUMPTION).

WITH THE SAME ADI FOR CADMIUM, AN ACCEPTABLE CONCENTRATION IN FLESH IS:

(0.15 MG CD/DAY) / (0.0003 TO 0.066 G FLESH/DAY) = 2.3 TO 500 MG CADMIUM/KG FLESH.

THE LOW END OF THIS LIMIT, 2.3 MG/KG, HAS NOT BEEN EXCEEDED IN MUSCLE OR WHOLE BODY OF FISH COLLECTED IN THE ORIGINAL RI (TABLES 6 AND 7, ACRES 1985).

THUS, WHEN USING MORE LIKELY SCENARIOS THAN THE KNEIP AND O'CONNOR METHOD, AND RELYING ON MEASURED DATA RATHER THAN MODELS, THERE APPEARS TO BE NO HUMAN HEALTH RISK UNIQUE TO THE SITE. FURTHER STUDY WOULD BE REQUIRED TO DETERMINE IF A HEALTH RISK TRULY EXISTS. AREAS WHICH MIGHT BE EXPLORED ARE:

- COLLECTION OF DATA IN FOUNDRY COVE AND THE LABORATORY WHICH WOULD SUPPORT A VALID MODEL OF POTENTIAL CADMIUM EXPOSURE TO HUMANS.

- CIRCUMVENTING THE MODEL ALTOGETHER AND CONDUCTING BIOMONITORING FOR CADMIUM IN INDIVIDUALS WHO CONSUME BIOTA FROM FOUNDRY COVE.

ENVIRONMENTAL THREAT

AS DEMONSTRATED BY THE FOLLOWING QUOTES FROM THE RI/FS, THERE IS LITTLE OR NO EVIDENCE OF BIOLOGICAL STRESS RESULTING FROM THE CADMIUM CONTAMINATION:

> "CONSTITUTION MARSH APPEARS PRODUCTIVE AND SHOWS NO OBVIOUS SYMPTOMS OF STRESS.". (PAGE 5-39 EBASCO, 1986A).

> "GENERALLY, THE MARSH ECOSYSTEM IS CONSIDERED HEALTHY BASED ON OBSERVATIONS BY MANY RESEARCHERS WHO HAVE WORKED AT THIS SITE BUT HAVE BEEN UNABLE TO FIND ANY MAJOR, ECOSYSTEM-WIDE, IMPACT WHICH COULD HAVE RESULTED FROM A STRESSED ENVIRONMENT.". (PAGE 3, EBASCO 1986A).

THE ONLY EFFECT ON THE ECOSYSTEM RESULTING FROM CADMIUM REPORTED IN THE LITERATURE WAS A DECREASE IN BENTHIC POPULATIONS IN LOCALIZED AREAS SUBSTANTIALLY CONTAMINATED WITH CADMIUM (AT LEAST 1000 PPM KNEIP ET AL 1979). THIS EFFECT WAS RECENTLY REPORTED TO BE REVERSING ITSELF (KNEIP, 1986).

THE LACK OF EVIDENT STRESS IN THE ECOSYSTEM DOES NOT SUPPORT THE PROPOSED REQUIREMENT OF A DECONTAMINATION GOAL OF 100 PPM PRESUMABLY ESTABLISHED FOR THE PROTECTION OF BIOTA. GIVEN THESE CONCLUSIONS, IT APPEARS THAT THE RECOMMENDED REMEDIAL OPTION IS MORE ENVIRONMENTALLY DETRIMENTAL THAN THE NO ACTION ALTERNATIVE.

THE RI/FS PROVIDES NO JUSTIFICATION FOR THE DECONTAMINATION OBJECTIVE OF 100 PPM CADMIUM

IT IS STATED IN THE RI:

> "SPECIFIC COMMENTS ON DATA GAPS AND DEFICIENCIES NOTED BY THE USACE (U.S. ARMY CORPS OF ENGINEERS - COMMENTS ON ORIGINAL ACRES RI) WHICH PROVIDED THE BASIS FOR ESTABLISHING THESE OBJECTIVES INCLUDED:... 3) THE JUSTIFICATION FOR THE 100 MG/KILOGRAM (MG/KG) CADMIUM CLEAN UP LEVEL. HOWEVER, USEPA HAS ADVISED EBASCO TO PERFORM THIS RI/FS WITH AN OBJECTIVE OF CLEANING UP THE CADMIUM IN THE SEDIMENTS ABOVE 100 MG/KG.". (PG 1-2 EBASCO, 1986A).

THUS, THE SUPPLEMENTAL RI CONTAINS THE IDENTICAL FLAW WHICH CONCERNED THE USACE IN THE ORIGINAL REPORT: NO DOCUMENTATION TO SUPPORT THE 100 PPM DECONTAMINATION GOAL. THE OMISSION OF WRITTEN JUSTIFICATION FOR THE DECONTAMINATION GOAL IS A DEVIATION FROM PROCEDURE WHICH MAKES IT DIFFICULT TO EVALUATE ONE OF THE PRIME SCREENING CRITERIA FOR REMEDIAL ALTERNATIVES.

A TELEPHONE CONVERSATION WITH THE EPA PROJECT MANAGER INDICATED THE EXISTENCE OF A MEMO FROM DR. HENRY LEE OF THE OFFICE OF RESEARCH AND DEVELOPMENT (NEWPORT, OREGON, AUGUST 5, 1985) THAT WAS USED TO SUPPORT THE DECONTAMINATION GOAL. EVEN IF THE LETTER WERE PART OF THE RI/FS, THE EIGHT COMMENTS IN THE MEMO PROVIDE NO BASIS FOR THE GOAL:

LEE'S COMMENTS 1, 2, 4 AND 5 INDICATE THAT BIOTA LIVING IN CADMIUM CONTAMINATED AREAS MAY BE EXPECTED TO HAVE HIGHER THAN NORMAL BURDENS OF THE METAL. HOWEVER, NONE OF THE CITED REFERENCES REPORT QUANTITATIVELY ON THE TOXIC EFFECT OF THE CADMIUM BURDEN. THEY ARE THEREFORE IRRELEVANT FOR ESTABLISHING A CRITERION BASED ON ADVERSE EFFECTS ON FOUNDRY COVE BIOTA.

LEE'S COMMENTS 3 AND 6 RELATE TO PARTITIONING OF CADMIUM FROM SEDIMENT TO WATER AND HOW THAT MIGHT AFFECT BIOTA IN THE COVE AREA. COMMENT 6 REFERS SPECIFICALLY TO A METHOD FOR DETERMINING SEDIMENT CRITERIA BASED ON LIMITING CONCENTRATIONS IN WATER TO BELOW THE USEPA AMBIENT WATER QUALITY CRITERIA (JRB ASSOCIATES, 1984). THE PROPORTION OF CADMIUM FOUND IN SEDIMENT TO THAT IN AQUEOUS SOLUTION IN A MARSH AREA WILL DEPEND NOT ONLY ON TOTAL ORGANIC CARBON (TOC) CONTENT BUT ALSO ON OTHER SITE-SPECIFIC FACTORS, SUCH AS PH, OXIDATION/REDUCTION POTENTIAL, TEMPERATURE, AND THE CHEMICAL CONSTITUENTS OF THE WATER. THEREFORE, ANY MODEL FOR PARTITIONING BASED ON SIMPLIFYING ASSUMPTIONS WILL ONLY APPROXIMATELY RELATE TO A SPECIFIC SITE. THE TABLE ON PAGE 14 OF JRB ASSOCIATES (1984) LISTS PARTITIONING VALUES (KOC) OBTAINED EMPIRICALLY FROM 11 DIFFERENT LOCATIONS AROUND THE COUNTRY WHICH RANGE FROM 3,000 IN THE DUWAMISH WATERWAY TO 325,000 IN THE HUDSON RIVER. THE MEAN OF THESE VALUES IS 64,000 +/- 86,000, SO THE PARTITION CONSTANTS FOR THE LOCATION CLOSEST TO FOUNDRY COVE (HUDSON RIVER) DO NOT FALL WITHIN 3 STANDARD DEVIATIONS OF THE MEAN. THIS EXTREME VARIANCE DEMONSTRATES THE LEVEL OF ERROR THAT COULD EXIST IN APPLYING A GENERAL MODEL TO A SPECIFIC SITE. THUS, THE EQUATIONS AVAILABLE FROM JRB ASSOCIATES (1984) ARE NOT USEFUL FOR SETTING A DECONTAMINATION GOAL. SITE-SPECIFIC STUDIES WOULD BE REQUIRED TO DETERMINE THE CHRONIC SEDIMENT CRITERIA FOR THE MARATHON BATTERY SITE USING THIS METHODOLOGY. HOWEVER, CONTRARY TO A KEY ASSUMPTION IN THE JRB MODEL, A TIDAL CONTROLLED MARSH SUCH AS FOUNDRY COVE WOULD NOT BE EXPECTED TO REACH EQUILIBRIUM OF CADMIUM CONCENTRATION BETWEEN SEDIMENT AND WATER. THEREFORE, ASSUMPTIONS AND CRITERIA ON WHICH THIS METHOD ARE BASED MAY BE INAPPROPRIATE FOR THE SITE IN QUESTION. THE EFFECT OF NON-EQUILIBRIUM CONDITIONS, AS INDICATED IN COMMENT 3 OF LEE'S MEMO, WOULD BE TO DECREASE WATER AND BIOTA BURDENS OF CADMIUM.

LEE'S COMMENT 7 DESCRIBES THE LACK OF DATA WHICH WOULD SUPPORT THE PROPOSITION THAT SEDIMENT-BOUND CADMIUM IS READILY BIOAVAILABLE. IT GOES ON TO SUGGEST THAT "UNDER CERTAIN CIRCUMSTANCES SEDIMENT CADMIUM MAYBE READILY AVAILABLE TO AT LEAST SOME INFAUNAL ORGANISMS". THIS CONCLUSION FURTHER SUPPORTS THE ASSERTION THAT SITE-SPECIFIC DATA SHOULD BE USED TO DETERMINE UPTAKE IN ORGANISMS IN THE COVE ECOSYSTEM.

LEE'S COMMENT 8 DISCUSSES THE RESULTS OF A STUDY ON SEDIMENT TOXICITY FOR AN AMPHIPOD USING HIGH ORGANIC SEDIMENT COLLECTED NEAR THE L.A. SEWAGE OUTFALL. THE RESULTS OF THIS STUDY MAY BE CORRECT, BUT, AGAIN, ARE NOT SITE SPECIFIC OR PARTICULARLY RELEVANT. DATA FROM FOUNDRY COVE SHOULD BE USED TO EVALUATE THE SITE-SPECIFIC CONDITIONS. WHERE THIS WAS DONE, FEW PERCEPTIBLE IMPACTS WERE ENCOUNTERED.

ANOTHER TELEPHONE CONVERSATION WITH THE EPA PROJECT MANAGER INDICATED THAT A PAPER BY MCNAUGHTON, ET AL (1974) WAS PARTICULARLY RELEVANT TO THE 100 PPM CRITERIA. THIS ARTICLE PRESENTS A STUDY CONDUCTED ON BROAD-LEAF CATTAILS GROWN IN HEAVY METAL-CONTAMINATED SOILS. THE RESULTS OF THIS STUDY INDICATES THAT, AT A CADMIUM CONCENTRATION OF 74 MG/KG, STUNTED GROWTH OF THE CATTAIL PLANTS MAY BE OBSERVED. HOWEVER, NO OTHER EFFECTS OCCURRED AND THE STUDY CONCLUDED THAT CATTAIL PLANTS APPEAR TO HAVE A NATURAL RESISTANCE TO CADMIUM. THE USE OF THESE RESULTS TO SUPPORT A DECONTAMINATION LEVEL OF 100 MG/KG DISREGARDS THE ACTUAL CONDITIONS AT THE SITE. WITH RESPECT TO THE TOXIC EFFECTS ON CATTAIL PLANTS GROWING IN FOUNDRY COVE, THE RI REPORTS:

> "CATTAILS CURRENTLY GROWING IN THE EAST FOUNDRY COVE MARSH... EVIDENTLY TOLERATE SEDIMENT CONCENTRATIONS NEAR 28,000 MG/KG. THIS OBSERVATION AND THE APPARENT VIGOR OF CATTAILS THROUGHOUT THE MARATHON BATTERY SITE SUGGEST THE CAPABILITY OF THIS SPECIES TO ACCLIMATIZE TO EVEN VERY HIGH CONCENTRATIONS OF CADMIUM" (PG 5-28, EBASCO, 1986B).

IN SUMMARY, THERE IS NOTHING IN THE RI/FS TO SUPPORT THE 100 PPM DECONTAMINATION GOAL. BY CONTRAST, THE HEALTH-BASED GOAL OF 900 PPM, WHICH WAS NEVER CONSIDERED IN THE REMEDIAL ALTERNATIVE SCREEN, WAS EVALUATED IN SUBSTANTIAL DETAIL. THE DOCUMENTATION OFFERED AS JUSTIFICATION FOR THE 100 PPM GOAL FAILED TO VALIDATE THIS VALUE. THE AGENCY AND ITS CONSULTANTS HAVE IGNORED SITE-SPECIFIC DATA WHICH CONTRADICTS THE SIMULATIONS AND OFF-SITE OBSERVATIONS APPARENTLY USED TO DEVELOP THE DECONTAMINATION GOAL. THE USE OF THE 100 PPM DECONTAMINATION GOAL UNDERMINES THE BASIS FOR SELECTION OF A REMEDIAL ALTERNATIVE. DEVELOPMENT OF APPROPRIATE AND VALID DESIGN GOALS ARE REQUIRED BEFORE SCREENING CAN TAKE PLACE.

THE RI/FS FAILS TO ADEQUATELY EVALUATE THE VIABILITY OF TREATMENT OPTIONS AND THEIR ENVIRONMENTAL CONSEQUENCES

THE RI/FS DOES NOT PRESENT AN ADEQUATE EVALUATION OF WHETHER THE TREATMENT OPTIONS ARE TRULY FEASIBLE. NO USE WAS MADE OF INFORMATION FROM THE REMEDIATION COMPLETED VIA DREDGING IN 1972, NOR HAS THE POTENTIAL FOR USEFUL INFORMATION WHICH WILL BE GENERATED DURING THE PHASE II RI/FS, BEEN ASSESSED. LESS THAN CAREFUL CONSIDERATION WAS GIVEN TO THE POTENTIAL RISKS INCURRED IN TRANSPORTING THE SEDIMENTS OFF-SITE, AND TO THE POTENTIAL OF THE RISK OF TRANSPORTATION-RELATED INJURIES EXCEEDING THE RISK REDUCTION ACHIEVED BY THE SELECTED REMEDIAL ALTERNATIVE. IN ADDITION, SEVERAL ASPECTS ASSOCIATED WITH THE TECHNOLOGIES DISCUSSED IN THE RI/FS WERE NOT ADDRESSED, INCLUDING:

- ACCORDING TO REGULATIONS PROMULGATED PURSUANT TO THE RCRA AMENDMENTS OF 1984, PRIOR TO DISPOSAL, A TEST TO DETERMINE LIQUID CONTENT WILL HAVE TO BE CONDUCTED ON THE SEDIMENTS. SINCE DEWATERING IS NOT TOTALLY EFFECTIVE IN REMOVING "FREE LIQUIDS", AND OFTEN LONG DISTANCE TRANSPORT CAUSES FURTHER SEPARATION, THESE EXCAVATED SEDIMENTS MAY NOT PASS THIS TEST. THUS, THE SEDIMENTS WOULD NOT BE ACCEPTABLE FOR DISPOSAL AT THE FACILITY. THE POTENTIAL FOR THIS OCCURRING SHOULD BE THOROUGHLY EVALUATED PRIOR TO RECOMMENDING A REMEDIAL ACTION.

- THE PUBLIC ACCEPTANCE OF A DISPOSAL ALTERNATIVE THAT INVOLVES THE USE OF FIXED SEDIMENTS AS COVER MATERIAL AT A LOCAL SANITARY LANDFILL SHOULD BE DETERMINED PRIOR TO RECOMMENDING A REMEDIAL ACTION.

- THE SUCCESS OF THE FIXATION PROCESS IS QUESTIONABLE. DURING THE SEPTEMBER 18 MEETING, A SUCCESS RATE OF 50% WAS SUGGESTED BY EPA'S CONSULTANTS, AND THAT FURTHER TESTING IS REQUIRED TO JUSTIFY USE OF FIXATION AT THE SITE. THIS HIGH FAILURE RATE WAS NOT INCORPORATED INTO THE EVALUATION OF THE VIABILITY OF THIS OPTION.

- THE RI/FS DID NOT ADEQUATELY EVALUATE THE "ON-SITE" LANDFILL OPTION. EPA ONLY ASSESSED A "RCRA" LANDFILL FOR THE ON-SITE OPTION, YET IS WILLING TO FAVOR THE OFFSITE USE OF FIXED SEDIMENTS AS COVER IN A SANITARY LANDFILL. A NON-RCRA ON-SITE FACILITY MAY BE VIABLE AND SHOULD BE PROPERLY ADDRESSED. A PRECEDENT FOR THIS ALTERNATIVE HAS BEEN ESTABLISHED WITH THE DEVELOPMENT AND PERFORMANCE OF THE ON-SITE VAULT BUILT IN 1973. A SIMILAR FACILITY OR ADDITION TO THE EXISTING FACILITY MAY BE VIABLE.

- THE PHASE II REMEDIAL INVESTIGATION EVALUATING CADMIUM CONCENTRATIONS IN THE HUDSON RIVER SEDIMENTS IS YET TO BE INITIATED. CADMIUM CONCENTRATIONS IN THIS PART OF THE LOCAL ENVIRONMENT MUST ALSO BE CONSIDERED TO DEVELOP AN ACCURATE HEALTH BASED, TECHNICALLY ACHIEVABLE, COST EFFECTIVE REMEDIAL ALTERNATIVE.

THE RI/FS PREMATURELY ELIMINATES POTENTIAL REMEDIAL OPTIONS THAT ARE ENVIRONMENTALLY PREFERABLE AND MORE COST EFFECTIVE THAN THE EPA'S PREFERRED ALTERNATIVES

THE EPA AND NYSDEC SPECIFIED THAT THE REMEDIATION OF SEDIMENTS CONTAMINATED WITH CADMIUM ABOVE 100 MG/KG IS REQUIRED. THIS DECONTAMINATION GOAL WAS SET PRIOR TO THE FS EVALUATION WITHOUT TAKING INTO ACCOUNT THE ADVERSE ENVIRONMENTAL IMPACTS THAT WILL RESULT FROM THE IMPLEMENTATION OF A REMEDIAL ACTION TO ACHIEVE THIS GOAL. BECAUSE THIS GOAL WAS SET PRIOR TO THE FS, THE RISK ASSESSMENT AND ITS CONCLUSIONS WERE NOT GIVEN SERIOUS CONSIDERATION. AS A RESULT, THE NO ACTION ALTERNATIVE AND OTHER DREDGING OPTIONS THAT ARE LESS ENVIRONMENTALLY DETRIMENTAL AND MORE COST-EFFECTIVE WERE NOT ADEQUATELY EVALUATED.

DURING THE PRELIMINARY TECHNOLOGY EVALUATION, BOTH COMPLETE DREDGING (TO THE 100 ISOPLETH) AND PARTIAL DREDGING OPTIONS WERE EVALUATED. THE 100 MG/KG DECONTAMINATION GOAL WAS USED BY EPA DURING THE SCREENING OF THE TECHNOLOGIES TO ELIMINATE THE PARTIAL REMOVAL OPTION.

> "BECAUSE THE CONTAMINANT LEVELS VARY THROUGHOUT AREA I SEDIMENTS (WITH AREAS OF HIGH CONTAMINATION AND HOT SPOTS DISPERSED AMONG LESS CONTAMINATED SECTIONS), AND THE ASSUMPTION WAS MADE FOR THIS SUPPLEMENTAL FEASIBILITY STUDY THAT ALL SEDIMENTS CONTAMINATED WITH CADMIUM ABOVE 100 MG/KG LEVEL WERE TO BE REMEDIATED, CONSIDERATION OF TECHNOLOGIES FOR ONLY PARTIAL REMOVAL OF THE HOT SPOTS WAS DETERMINED TO BE INAPPLICABLE FOR THIS SCREENING STAGE. THEREFORE, THE FOLLOWING CATEGORIES AND INDIVIDUAL TECHNOLOGIES WERE SELECTED AND EVALUATED BASED ON THE COMPLETE REMOVAL OF ALL SEDIMENTS CONTAMINATED WITH CADMIUM ABOVE THE 100 MG/KG LEVEL FROM EAST FOUNDRY COVE AND CONSTITUTION MARSH.". (PG. 2-25, EBASCO (1986B)).

THE ELIMINATION OF THE PARTIAL REMOVAL OPTION PREVENTS THE DEVELOPMENT AND EVALUATION OF ALTERNATIVES INVOLVING "HOT SPOT" OR LIMITED DREDGING WITHIN EAST FOUNDRY COVE AND EAST FOUNDRY COVE MARSH. THESE ALTERNATIVES WOULD BE LESS ENVIRONMENTALLY DETRIMENTAL THAN THE PRESENT PROPOSAL. AS PREVIOUSLY STATED, THE EXTENT OF POTENTIAL ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED DREDGING ALTERNATIVE HAS NOT BEEN FULLY ADDRESSED IN THE FS. THE POTENTIAL EFFECTS ON THE ECOLOGY OF THE AREA ARE GREAT. AS SUCH, SERIOUS CONSIDERATION MUST BE GIVEN TO THE NO ACTION ALTERNATIVE FOR EAST COVE MARSH AND EAST COVE.

THE USE OF AN ALTERNATE METHOD TO DETERMINE THE EXTENT OF DREDGING REQUIRED, OTHER THAN THE 100 MG/KG DECONTAMINATION GOAL PROPOSED BY EPA WOULD ALLOW FOR THE CONSIDERATION AND EVALUATION OF OTHER ALTERNATIVES THAT MAY PROVIDE A HIGH LEVEL OF CLEANUP WHILE DRASTICALLY REDUCING THE ADVERSE ENVIRONMENTAL EFFECTS ASSOCIATED WITH THE REMEDIAL ACTION. THIS METHOD SHOULD BE BASED ON AN EVALUATION OF THE CONTAMINANT CONCENTRATION DATA, THE PRESENT ECOLOGICAL AND HYDRAULIC CONDITIONS WITHIN THE AREA, AND A COST/BENEFIT ANALYSIS OF THE POTENTIAL DREDGING OPERATIONS. WITHOUT THE CONSTRAINTS OF THE 100 MG/KG DECONTAMINATION GOAL, ALTERNATE DREDGING PROGRAMS, AS DISCUSSED BELOW, COULD BE DEVELOPED THAT ACHIEVE A SIMILAR CLEANUP LEVEL AS THE PROPOSED DREDGING ALTERNATIVE. EVEN IF A DECONTAMINATION GOAL OF GT900 MG/KG COULD BE JUSTIFIED, MORE COST-EFFECTIVE AND MUCH LESS DETRIMENTAL ALTERNATIVES THAN THOSE IDENTIFIED IN THE FS COULD BE DEVELOPED.

AN INITIAL EVALUATION OF THE DATA PRESENTED IN THE REMEDIAL INVESTIGATION REPORTS INDICATE THAT THERE IS A STRONG CORRELATION BETWEEN THE AREAS OF HIGH SEDIMENT CONCENTRATION AND ESTABLISHED FLOW CHANNELS. THUS, MORE COST-EFFECTIVE AND ENVIRONMENTALLY SOUND ALTERNATIVES FOR THE EAST COVE MARSH AND EAST COVE WOULD INVOLVE A PARTIAL DREDGING PROGRAM. THE DREDGING OF THE OUTFALL AREA OR WITHIN THE EXISTING CHANNELS OF EAST COVE MARSH WOULD REMOVE HIGHLY CONTAMINATED SEDIMENTS WHILE GREATLY MINIMIZING THE ADVERSE ENVIRONMENTAL IMPACTS. WITHIN EAST COVE, IT IS FEASIBLE THAT THE HIGHLY CONTAMINATED BOTTOM SEDIMENTS (GT900 MG/KG) BE REMOVED.

A HOT SPOT DREDGING ALTERNATIVE WOULD INVOLVE REMOVING THE HIGHLY CONTAMINATED SEDIMENTS WITHIN THE EAST COVE MARSH OUTFALL AREA, WHILE A CHANNEL DREDGING ALTERNATIVE WOULD INVOLVE THE REMOVAL OF SEDIMENTS LOCATED IN THE EXISTING FLOW CHANNELS WITHIN EAST COVE MARSH. UNDER BOTH ALTERNATIVES, THE HIGHLY CONTAMINATED SEDIMENTS (GT900 MG/KG) WITHIN EAST COVE WOULD BE REMOVED. THESE DREDGING ALTERNATIVES WILL INVOLVE THE REMOVAL OF SEDIMENTS WITHIN THE 900 MG/KG ISOPLETHS AND, AS SUCH, INVOLVE THE DREDGING OF A MUCH SMALLER AREA THAN REQUIRED TO MEET THE 100 MG/KG DECONTAMINATION GOAL. THEY WOULD ALSO PROVIDE THE MAXIMUM CADMIUM REMOVAL PER CUBIC YARD OF DREDGED SEDIMENT WHILE MINIMIZING THE ADVERSE EFFECTS OF A DREDGING OPERATION IN THIS AREA.

BY DREDGING STRICTLY WITHIN THE OUTFALL AREA OR WITHIN THE EXISTING CHANNELS IN EAST COVE MARSH, ADEQUATE DRAFT (APPROXIMATELY 2 FEET) MAY BE AVAILABLE FOR THE DREDGING OPERATION AS WAS THE CASE IN 1972. THE CONSTRUCTION OF A CONTAINMENT DIKE AROUND THE MARSH AND ITS SUBSEQUENT FLOODING AND VEGETATION HARVESTING, AS INCLUDED IN THE PROPOSED ALTERNATIVE, WOULD NOT BE REQUIRED. THE MARSH AND ITS ECOSYSTEM WOULD NOT BE DESTROYED AND MARSH RESTORATION WOULD THEREFORE NOT BE REQUIRED. FURTHERMORE, THE EXISTING FLOW PATTERNS WITHIN EAST COVE MARSH WOULD NOT BE GREATLY AFFECTED SINCE A DIKE WOULD NOT BE CONSTRUCTED AND THE EFFECTS THAT THESE FLOW CHANGES WOULD HAVE HAD WITHIN CONSTITUTION MARSH WOULD BE ELIMINATED. SIMILARLY, DREDGING ONLY WITHIN AREAS OF HIGHLY CONTAMINATED SEDIMENTS IN EAST COVE WOULD MINIMIZE THE ADVERSE ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE COMPLETE DREDGING OF THIS AREA AS REQUIRED UNDER THE PROPOSED DREDGING

ALTERNATIVE.

THE DREDGING OF THE FLOW CHANNELS WITHIN EAST COVE MARSH AND THE HIGHLY CONTAMINATED SEDIMENTS WITHIN EAST COVE (CHANNEL DREDGING ALTERNATIVE) WILL INITIALLY ATTAIN A CLEANUP LEVEL OF APPROXIMATELY 900 MG/KG AND MAY ULTIMATELY ACHIEVE A CLEANUP LEVEL COMPARABLE TO THE PROPOSED DREDGING ALTERNATIVE. PROVIDED THAT THE DREDGING IS RESTRICTED TO THE EXISTING CHANNEL AREAS, THE REMOVAL OF SEDIMENT FROM THESE AREAS SHOULD INITIATE A REVERSAL OF SEDIMENT MIGRATION PATTERNS LOCAL TO THE CHANNELS. IN CONSEQUENCE, THERE WOULD BE A TENDENCY FOR THE CONTAMINATED SEDIMENTS REMAINING IN EAST COVE MARSH AND EAST COVE TO MIGRATE AND TO DEPOSIT IN THESE CHANNEL AREAS. THE MONITORING PROGRAM SHOULD INCLUDE PERIODIC SEDIMENT SAMPLING AND ANALYSIS WHICH WOULD PROVIDE AN INDICATION OF THE NEED FOR FURTHER DREDGING AND WHICH, IN TURN, WOULD REENERGIZE THE SYSTEM. THIS CONCEPT WOULD BE MOST COST-EFFECTIVE (IN TERMS OF POUNDS OF CADMIUM REMOVED PER CUBIC YARD OF SEDIMENT DREDGED) IN THE FIRST OPERATION AND WOULD BE EXPECTED TO BE LESS EFFICIENT WITH ANY SUBSEQUENT DREDGING OPERATION.

TO EVALUATE THE POTENTIAL EFFECTIVENESS OF THESE DREDGING OPTIONS AND TO COMPARE THEIR EFFECTIVENESS WITH THAT ASSOCIATED WITH THE PROPOSED DREDGING ALTERNATIVE, A ROUGH ESTIMATE OF THE SEDIMENT VOLUMES DREDGED UNDER EACH ALTERNATIVE AND THE ASSOCIATED POUNDS OF CADMIUM REMOVED DURING THE DREDGING PROGRAMS WERE ESTIMATED. AN INITIAL COMPARATIVE ANALYSIS BETWEEN THE HOT SPOT AND CHANNEL DREDGING ALTERNATIVES AND THE PROPOSED DREDGING ALTERNATIVE IS SUMMARIZED IN TABLE 2. AS SHOWN, THE HOT SPOT AND CHANNEL DREDGING ALTERNATIVES ARE FAR MORE EFFICIENT THAN THE PROPOSED DREDGING PROGRAM. ASSUMING THAT APPROXIMATELY 112,000 POUNDS OF CADMIUM WERE DISCHARGED INTO THE COVE AND THAT THE 1972 DREDGING PROGRAM REMOVED APPROXIMATELY 12,000 POUNDS OF CADMIUM, IT IS ESTIMATED THAT APPROXIMATELY 100,000 POUNDS OF CADMIUM REMAIN IN FOUNDRY COVE (REI, 1983). COMPARED TO THE PROPOSED DREDGING ALTERNATIVE, WHICH WOULD REMOVE APPROXIMATELY 75 PERCENT OF THE CADMIUM BY WEIGHT, THE CHANNEL DREDGING OPTION WOULD REMOVE APPROXIMATELY 69 PERCENT OF THE CADMIUM BY DREDGING ONLY ONE-SIXTH OF THE SEDIMENT VOLUME REMOVED UNDER THE PROPOSED DREDGING ALTERNATIVE. THE HOT SPOT DREDGING ALTERNATIVE WOULD REMOVE APPROXIMATELY 64 PERCENT OF THE CADMIUM IN FOUNDRY COVE WHILE DREDGING ONLY ONE-TENTH OF THE SEDIMENT VOLUME REMOVED UNDER THE PROPOSED DREDGING ALTERNATIVE WOULD BE REQUIRED.

SUMMARY

REVIEW OF THE RI/FS INDICATES THAT THE REQUIREMENTS AND GOALS OF THE RECOMMENDED OPTIONS ARE INAPPROPRIATE BECAUSE NO HUMAN HEALTH OR ENVIRONMENTAL RISK, CURRENT OR IMMINENT, WAS DEMONSTRATED BY THE SITE-SPECIFIC DATA PRESENTED IN THE RI.

A 100 MG/KG DECONTAMINATION GOAL WAS SET PRIOR TO THE RI/FS EVALUATION AND WITHOUT TAKING INTO ACCOUNT THE ADVERSE ENVIRONMENTAL IMPACTS THAT WILL RESULT FROM THE IMPLEMENTATION OF A REMEDIAL ACTION TO ACHIEVE THIS GOAL. BECAUSE THE DECONTAMINATION GOAL WAS SET PRIOR TO THE RI/FS, THE RISK ASSESSMENT CONCLUSIONS DID NOT RECEIVE SERIOUS EVALUATION AND CONSIDERATION. AS A RESULT, THE NO ACTION ALTERNATIVE AND OTHER DREDGING OPTIONS THAT ARE LESS ENVIRONMENTALLY DETRIMENTAL AND MORE COST-EFFECTIVE WERE NOT FULLY EVALUATED.

DESPITE THE USACE COMMENTS REGARDING THE NEED FOR JUSTIFICATION OF THE 100 MG/KG DECONTAMINATION GOAL, ABSOLUTELY NO SUPPORTING DOCUMENTATION FOR THIS GOAL WAS PRESENTED IN THE RI/FS. EPA STATED THAT THE 100 MG/KG DECONTAMINATION GOAL WAS BASED ON AN ORD, AUGUST 5, 1985, MEMO. THIS MEMO PRESENTS THEORETICAL SIMULATIONS AND FINDINGS AT OTHER LOCATIONS WITH WHICH SITE SPECIFIC DATA, PRESENTED IN THE RI, DO NOT COINCIDE. WHEN SITE-SPECIFIC DATA REFUTES THEORETICAL INFORMATION, SUCH AS AT FOUNDRY COVE, FURTHER VALIDATION OF SITE CONDITIONS IS WARRANTED.

REMEDIAL ACTIONS THAT MAY BE FAR LESS DETRIMENTAL TO THE ECOSYSTEM WITHIN FOUNDRY COVE AND THAT MAY ACHIEVE SIMILAR BENEFITS WERE NOT EVALUATED. ALSO, THE FULL REMEDIAL INVESTIGATION FOR THE ENTIRE SITE HAS NOT EVEN BEEN COMPLETED. IT IS IMPERATIVE THAT CONSIDERATION BE GIVEN TO A COMPLETE RI DATA BASE AND OTHER APPROPRIATE DATA BEFORE A REMEDIAL ACTION RECOMMENDATION IS MADE.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

AUGUST 5, 1985

US EPA
ATTN: JOEL SINGERMAN
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEAR JOEL:

AS A FOLLOW-UP ON OUR TELEPHONE CONVERSATIONS OF LAST WEEK, HERE IS A SUMMARY OF THE REASONS WHY I BELIEVE THAT A SEDIMENT CONCENTRATION OF 100 PPM (MG/KG) OF CADMIUM IS TOO HIGH TO ASSURE AN ACCEPTABLE ENVIRONMENTAL IMPACT. MY CONCERNS ARE BASED BOTH ON STUDIES THAT INDICATE THAT HIGH SEDIMENT CONCENTRATIONS ARE AN ENVIRONMENTAL PROBLEM BUT WHICH DO NOT OFFER SPECIFIC GUIDANCE AS TO A "SAFE" LEVEL, AND ON STUDIES THAT SUGGEST THAT 100 MG/KG IS TOO HIGH. ALL SEDIMENT CONCENTRATIONS GIVEN BELOW ARE IN MG/KG DRY WEIGHT.

A. GENERAL PROBLEMS WITH HIGH CONCENTRATIONS OF SEDIMENT CADMIUM

1. CADMIUM DEPURATES VERY SLOWLY, SO EVEN SLOW UPTAKE MAY EVENTUALLY RESULT IN AN UNACCEPTABLE BODY BURDEN. FOR EXAMPLE, RAY ET AL (1980. ACCUMULATION OF CADMIUM BY NEREIS VIRENS. ARCH. ENVIRONM. CONTAM. TOXICOL. 9:1-8.), FOUND "ESSENTIALLY NO EXCRETION" AFTER 175 DAYS IN CLEAN WATER.

2. ALTHOUGH THERE ARE CONFLICTING REPORTS, THERE IS SOME GOOD EVIDENCE THAT FOOD CAN BE AN IMPORTANT UPTAKE ROUTE FOR FILTER-FEEDING BIVALVES. RESUSPENSION OF THE SURFACE SEDIMENTS (AND ASSOCIATED MICROALGAE) MAY MAKE THE CADMIUM AVAILABLE FOR SUSPENSION-FEEDING BIVALVES SUCH AS OYSTERS OR MUSSELS AND, THUS, MAY RESULT IN UNACCEPTABLE TISSUE LEVELS IN THESE EPIFAUNAL ORGANISMS.

3. THE SEDIMENTS MAY GRADUALLY DESORP CADMIUM TO THE OVERLYING SURFACE WATER SO THAT EVEN IF THE SEDIMENTS ARE NOT THE MAJOR ROUTE OF UPTAKE, THEY MAY ACT AS A LONG-TERM SOURCE OF WATER CONTAMINATION. FACTORS WHICH WOULD INCREASE THE PROBABILITY OF HIGH WATER CONCENTRATIONS INCLUDE A LOW FLUSHING RATE OF THE OVERLYING WATER AND BIOTURBATION. FACTORS WHICH WOULD MITIGATE THE EFFECTS OF DESORPTION INCLUDE A HIGH SEDIMENT ORGANIC CONTENT, WHICH WOULD REDUCE THE EXTENT OF DESORPTION, AND RAPID FLUSHING, WHICH WOULD DILUTE THE CADMIUM CONCENTRATIONS.

4. SEDIMENTS MAY BE A DIRECT SOURCE OF CADMIUM FOR FISH. "THE PATTERN OF THESE DATA DOES NOT INDICATE ACCUMULATION THROUGH THE FOOD CHAIN BUT DOES INDICATE THE POTENTIAL FOR INCREASED CONCENTRATIONS DUE TO DIRECT CONTACT WITH SEDIMENTS" (PAGE 110 IN BIDDINGER AND GLOSS, 1984. THE IMPORTANCE OF TROPHIC TRANSFER IN THE BIOACCUMULATION OF CHEMICAL CONTAMINANTS IN AQUATIC ECOSYSTEMS. RESIDUE REV. 91:103-145, REFERRING TO STREAM STUDY OF ENK AND MATHIS 1977).

5. ROOTED AQUATICS (E.G., SPARTINA) MAY ACCUMULATE THE SEDIMENT CADMIUM MAKING IT AVAILABLE TO HERBIVORES AND TO THE DETRITAL FOOD CHAIN. I AM UNSURE OF THE IMPORTANCE OF THIS TRANSFER MECHANISM FOR CADMIUM, BUT ROOTED AQUATICS ARE KNOWN TO "PUMP" CONSIDERABLE AMOUNTS OF PHOSPHOROUS, IRON AND ZINC FROM SEDIMENTS.

B. EVIDENCE THAT 100 MG/KG OF CADMIUM WILL BE DETRIMENTAL

6. THE 100 MG/KG LEVEL IS HIGHER THAN THE CHRONIC SEDIMENT CRITERION BASED ON CALCULATED INTERSTITIAL WATER CONCENTRATIONS (JRB ASSOC., 1984. INITIAL EVALUATION OF ALTERNATIVES FOR DEVELOPMENT OF SEDIMENT RELATED CRITERIA FOR TOXIC CONTAMINANTS IN MARINE WATERS (PUGET SOUND). PHASE II: DEVELOPMENT AND TESTING OF THE SEDIMENT-WATER EQUILIBRIUM PARTITIONING APPROACH. EPA REPORT 910/9-83-117)). ASSUMING A "TOTAL ORGANIC CARBON" (TOC) CONCENTRATION OF 5%, THE CHRONIC SEDIMENT CRITERION FOR CADMIUM IS 38.5 MG/KG. ASSUMING A TOC OF 10%, THE CHRONIC LEVEL IS 77 MG/KG. THESE CRITERIA LEVELS ARE FIRST ORDER APPROXIMATIONS, AS THIS TECHNIQUE HAS NOT BEEN ADEQUATELY TESTED. NOTE THAT TOC IS NOT THE SAME AS TOTAL VOLATILE SOLIDS (%TVS OR LOSS ON IGNITION).

7. ALTHOUGH MOST STUDIES INDICATE THAT SEDIMENT-BOUND CADMIUM IS NOT READILY BIOAVAILABLE (E.G., AHSANULLAH

ET AL, 1984. ACCUMULATION OF CADMIUM FROM CONTAMINATED WATER AND SEDIMENT BY THE SHRIMP CALLIANASSA AUSTRALIENSIS. MAR. BIOL. 82:191-197.), A FEW STUDIES SUGGEST THAT SEDIMENT CADMIUM IS BIOACCUMULATED BY INFAUNAL ORGANISMS. A STUDY CONDUCTED UNDER A COOPERATIVE AGREEMENT WITH THIS LAB SHOWED THAT SOME POLYCHAETE WORMS ACCUMULATED MORE THAN 250 MG/KG OF CADMIUM WHEN EXPOSED TO 40 MG/KG IN THE SEDIMENT. IT IS POSSIBLE THAT THIS HIGH UPTAKE IS AN EXPERIMENTAL ARTIFACT (METHOD OF SPIKING SEDIMENT, OR DESORPTION OF CD FROM SEDIMENT TO WATER IN AQUARIA). ON THE UBIQUITOUS OTHER HAND, THE FACTORS CONTROLLING METAL BIOAVAILABILITY ARE POORLY UNDERSTOOD -- UNDER CERTAIN CIRCUMSTANCES SEDIMENT CADMIUM MAY BE READILY AVAILABLE TO AT LEAST SOME INFAUNAL ORGANISMS.

8. THE 100 MG/KG CONCENTRATION IS SUBSTANTIALLY HIGHER THAN THE SEDIMENT LC50 (7 MG/KG WITH A 10-DAY ACUTE TEST) FOR AN AMPHIPOD USING LOW ORGANIC SEDIMENTS (WORK DONE IN THIS LAB BY RICK SWARTZ). HOWEVER, SEDIMENT TOXICITY DECREASED WITH INCREASED ORGANIC CONTENT AND 77% OF THE AMPHIPODS SURVIVED FOR 10 DAYS WHEN EXPOSED TO HIGH ORGANIC SEDIMENT COLLECTED NEAR THE L.A. SEWAGE OUTFALL WITH A CADMIUM CONCENTRATION OF 32 MG/KG. IF YOUR SITE HAS A SUFFICIENTLY HIGH TOC, THE 100 MG/KG MAY NOT BE ACUTELY TOXIC, THOUGH THERE MAY BE CHRONIC EFFECTS. IN 10-DAY BIOACCUMULATION STUDIES WE CONDUCTED, HIGH LEVELS OF CADMIUM WERE NOT LETHAL TO THE POLYCHAETES, THOUGH THERE WAS AN INDICATION OF DAMAGE TO THE GILLS. IF THE REMEDIAL ACTIONS AT THE SITE OR OTHER POLLUTION CONTROL PROGRAMS SUBSTANTIALLY REDUCED THE ORGANIC INPUT, THE DECAY OF TOC IN THE SEDIMENT WOULD ALLOW THE CADMIUM TO BECOME MORE AVAILABLE.

A SEDIMENT CONCENTRATION OF 100 MG/KG CADMIUM SHOULD NOT RESULT IN EXTREMELY ADVERSE ENVIRONMENTAL IMPACTS, THOUGH I BELIEVE THERE WILL BE DETRIMENTAL EFFECTS. CERTAINLY, THERE IS UNCERTAINTY IN THIS PREDICTION, BUT UNCERTAINTY IS A TWO-EDGED SWORD. THE EFFECTS COULD BE WORST THAN EXPECTED. THE LOWER THE SEDIMENT CONCENTRATION, THE LESS THE ENVIRONMENTAL RISK. A SEDIMENT CONCENTRATION OF 25-50 MG/KG WOULD REDUCE THE ENVIRONMENTAL RISK TO AN ACCEPTABLE LEVEL BASED ON THE INFORMATION THAT I HAVE. IF THE SITE IS PARTICULARLY SENSITIVE (BREEDING SITE FOR ENDANGERED SPECIES, ETC.), A LOWER LEVEL MIGHT BE NEEDED.

AS I MENTIONED ON THE PHONE, WE ARE INTERESTED IN CONDUCTING A PRELIMINARY BIOACCUMULATION TEST ON THESE SEDIMENTS. AFTER WE GET A CHANCE TO LOOK OVER YOUR FIELD DATA, I WILL SEND YOU AN EXPERIMENTAL DESIGN FOR COMMENT.

SINCERELY,

HENRY LEE, II, PH.D.
FOOD WEB TEAM LEADER

CC: BAUMGARTNER
GARNAS.

REVIEW OF THE PAPER ON FOUNDRY COVE SEDIMENTS

I HAVE RAPIDLY REVIEWED THE REPORTS BY EBASCO ON THE SUPERFUND SITE IN FOUNDRY COVE. THE DATA APPEAR TO BE QUITE GOOD WITH GOOD SAMPLING, ANALYSIS AND QUALITY ASSURANCE PROGRAMS.

HOWEVER, THE DATA EVALUATION AND ESTIMATES OF POSSIBLE RISKS SEEM TO HAVE SEVERAL SERIOUS PROBLEMS. THE OVERALL CONCLUSIONS AND THE PROPOSED REMEDIATION STEPS ARE BASED ON A FAULTY DECISION REGARDING THE LIKELIHOOD OF HUMAN HEALTH HAZARDS.

THE SUPERFUND WORK ON FOUNDRY COVE ORIGINATED AS A STUDY OF THE SITE TO DEFINE THE EXTENT OF CONTAMINATION AND POSSIBLE NEED FOR REMEDIATION. THE FINAL STAGE WAS TO BE THE PRODUCTION OF ANY NECESSARY ENGINEERING PLANS. THE STUDY DESIGN REFLECTS THESE OBJECTIVES. THERE WAS NO APPARENT INTENT TO DEFINE THE PATHWAYS OF EXPOSURE FOR THE BIOTA, NOR TO OBTAIN DATA TO SUPPORT THE DEVELOPMENT OF MATHEMATICAL MODELS OF ENVIRONMENTAL OR METABOLIC SYSTEMS. THE MODELS USED FOR HUMAN EXPOSURE ESTIMATES AND RISK ASSESSMENTS ARE THUS BASED ON TOTALLY INADEQUATE DATA BASES. THE ORIGINAL BID REQUESTS AND PROPOSALS SHOULD CONFIRM THIS.

THERE IS NO DATA THAT I KNOW OF TO SUPPORT A DIRECT RELATIONSHIP BETWEEN SEDIMENT AND CRAB TISSUE CADMIUM CONTENTS. THE CONCLUSION THAT A HEALTH RISK HAS BEEN PROVEN BY THE WORK REPORTED BY MYSELF AND DR. O'CONNOR IS A CASE OF OVERINTERPRETATION. OUR RESULTS WERE BASED ON A SET OF ONLY 8 CAPTURED CRABS (SEE ENCLOSED REPORT). * THERE WAS NO ATTEMPT TO RELATE CRAB CADMIUM CONTENTS TO SEDIMENT CONCENTRATIONS AS THE SPATIAL HISTORY OF THE CAPTURED CRABS WAS UNKNOWN. THE IMPLANTED CRABS FROM ANOTHER PART OF THE EXPERIMENT DID NOT ACCUMULATE AS MUCH CADMIUM AS WAS FOUND IN THE CAPTURED ANIMALS.

THE CALCULATIONS OF POTENTIAL HUMAN EXPOSURES WERE BASED ON EXTREME ASSUMPTIONS, AND WERE DONE AS EXAMPLES OF POSSIBLE -- NOT PROBABLE – EXPOSURES. NO EFFORT WAS MADE TO ESTIMATE PROBABILITIES FROM THE SMALL DATA SET USED. THE CONCLUSIONS CLEARLY STATED THE LIMITATIONS OF THE STUDY AND THE NEED FOR FURTHER INFORMATION.

* THE ENCLOSED REPORT WAS KNEIP AND O'CONNOR, 1979 WHICH IS CITED IN THE REFERENCES.

THE STATE UNDERTOOK FURTHER WORK AND SOME TWO YEARS LATER ISSUED A HEALTH ADVISORY CONCERNING CRABS IN THE ENTIRE HUDSON RIVER ESTUARY. THERE WAS INTENT AND EFFORT TO CLOSE THE FISHERY IN THE AREA OF THE COVE, BUT THE DEGREE OF SUCCESS IS NOT KNOWN.

TO MY KNOWLEDGE, NO STATE SCIENTIST OR ADMINISTRATOR CALLED FOR REMEDIATION OF THE AREA OF THE COVE ON THE BASIS OF THE DATA COLLECTED TO IMPROVE THE HUMAN HEALTH RISK ESTIMATES. THE ADVISORY HAS RECEIVED VERY LITTLE PUBLICITY AND NEVER WAS AN ACTION TO CLOSE THE CRAB FISHERY. IT IS UNLIKELY THAT A CLEANUP OF THE COVE ALONE WOULD CORRECT THE PROBLEMS IN THE ENTIRE ESTUARY.

A SECOND MAJOR PROBLEM LIES IN THE FACT THAT THE EBASCO MODEL FOR EXPOSURE OF THE FISH PRODUCES CALCULATED FISH TISSUE CONCENTRATIONS WHICH DO NOT MATCH THE MEASURED VALUES. AS THE MEASURED VALUES ARE MUCH LOWER, THE RISKS WHICH ARE SUBSEQUENTLY CALCULATED ARE MUCH HIGHER THAN REALITY. THE CRITICAL SEDIMENT CONCENTRATION MAY BE 10,000 OR EVEN 100,000 PPM, IF AN ACCURATE ENVIRONMENTAL/METABOLIC MODEL WERE TO BE DEVELOPED. UNLIKE MAMMALS, FISH AND CRABS ARE CAPABLE OF EXCRETING THE CADMIUM WHEN EXPOSURES ARE LOWERED.

MY INITIAL CONCLUSIONS ARE THAT A NEED FOR REMEDIATION REMAINS UNPROVEN. THE REMOVAL OF THE SEDIMENTS IN ONLY A PORTION OF THE COVE WOULD RESULT IN THE EVENTUAL REESTABLISHMENT OF THE SAME CADMIUM CONCENTRATION CONTOURS BY RESUSPENSION, RAINFALL EROSION AND TIDAL TRANSFER AS PREVIOUSLY OCCURRED AFTER THE EARLIER DREDGING. THE ASSUMPTION THAT CONTAMINATION CAN BE LEFT IN THE AUDUBON SANCTUARY WITHOUT AN EFFECT ON THE COVE APPEARS IMPLICIT IN THE PROPOSAL. THIS IS NOT WELL FOUNDED. NO LOCAL REMEDIATION COULD BE EXPECTED TO IMPROVE THE CONTAMINATION OF CRABS IN OTHER LOCATIONS SUCH AS HAVERSTRAW BAY.

THEO. J. KNEIP
9/11/86.

ATTACHMENT

REI REPORT

"PRELIMINARY SITE BACKGROUND DATA ANALYSIS OF FOUNDRY COVE"

FOUNDRY COVE

PRELIMINARY SITE BACKGROUND DATA ANALYSIS

1.0 INTRODUCTION

ON JUNE 23 OF THIS YEAR, MARATHON BATTERY COMPANY RECEIVED NOTIFICATION FROM THE U.S. EPA OF ITS INTENT TO INVESTIGATE A "RELEASE OR THREATENED RELEASE OF POLLUTANTS" FROM THE "FOUNDRY COVE" NATIONAL PRIORITY LIST (NPL) SITE, PURSUANT TO THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA, COMMONLY KNOWN AS SUPERFUND). INCLUDED IN EPA'S NOTIFICATION WAS A REQUEST FOR MARATHON TO SUPPLY INFORMATION RELATIVE TO A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY TO DETERMINE THE APPROPRIATENESS OF CORRECTIVE ACTION AT THE SITE. REPRESENTATIVES OF MARATHON BATTERY COMPANY IMMEDIATELY CONTACTED THE EPA AND SCHEDULED A MEETING WHICH WAS HELD ON MAY 2, 1983 TO DISCUSS THE COMPANY'S RESPONSE.

AT THAT MEETING, REPRESENTATIVES OF MARATHON INDICATED THE COMPANY'S POSITION THAT THE SETTLEMENT OF THE PRIOR LITIGATION, UNITED STATES OF AMERICAN V. MARATHON BATTERY COMPANY, ET AL., 70 CIV. 4110, UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF NEW YORK, RELEASED MARATHON FROM ANY LIABILITY RESULTING FROM THE DISCHARGE OF POLLUTANTS DURING THE PERIOD OF TIME MARATHON OPERATED THE PLANT, BUT FURTHER INDICATED MARATHON'S WILLINGNESS TO ASSIST THE AGENCY IN COMPILING DATA PERTINENT TO THE CONTAMINATION OF FOUNDRY COVE. IN THAT REGARD, THE HISTORY OF SITE OWNERSHIP AND OPERATION WAS DISCUSSED TO THE EXTENT THAT DATA WERE THEN AVAILABLE, AND AN EXTENSION OF TIME WAS REQUESTED TO FULLY RESPOND TO THE DEMAND LETTER. REPRESENTATIVES OF THE EPA AUTHORIZED AN EXTENSION OF TIME UNTIL AUGUST 1, 1983 TO PRODUCE A SUMMARY OF AVAILABLE DATA THAT WOULD SERVE AS A SITE BACKGROUND DATA ANALYSIS FOR THE FOUNDRY COVE SITE. THE LAW FIRM OF VINSON AND ELKINS, REPRESENTING MARATHON BATTERY COMPANY, HAS RETAINED RESOURCE ENGINEERING TO ASSIST IN THE PREPARATION OF THIS ASSESSMENT. IN PREPARING THIS ANALYSIS, HISTORIC FILE DATA HAVE BEEN REVIEWED FROM THE FOLLOWING SOURCES:

1.1 FILES MAINTAINED BY THE ENVIRONMENTAL PROTECTION AGENCY RELATIVE TO THE FOUNDRY COVE MATTER, INCLUDING THOSE RELATING TO PAST ENFORCEMENT ACTIVITIES AND THE PRESENT POTENTIAL CERCLA ACTION.

1.2 FILES MAINTAINED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION RELATING TO THEIR ENVIRONMENTAL SURVEILLANCE OF THE SITE DURING PAST YEARS.

1.3 FILES FROM THE PRIOR LITIGATION, OBTAINED FROM VINSON AND ELKINS, WHO REPRESENTED MARATHON BATTERY AT THAT TIME.

1.4 MISCELLANEOUS TECHNICAL FILES MAINTAINED BY MARATHON BATTERY COMPANY AND ITS REPRESENTATIVES DURING MARATHON'S TENURE OF OWNERSHIP OF THE FACILITY, AS WELL AS FILES TRANSFERRED TO MARATHON BATTERY BY PRIOR OWNERS.

1.5 A SUBSTANTIAL AMOUNT OF LITERATURE DATA FROM PUBLICATIONS, JOURNALS, AND GOVERNMENT FUNDED RESEARCH PROGRAMS, WHICH FOCUSED ON VARIOUS STUDIES OF THE FOUNDRY COVE AREA AND RELATED ENVIRONMENTAL IMPACTS.

FROM THE PRESENT REVIEW OF THE DATA, INFORMATION RELEVANT TO THE RELATIONSHIP OF THE VARIOUS PARTIES TO THE SITE AND THE NATURE AND QUANTITY OF MATERIALS DISCHARGED DURING VARIOUS COMPANIES' TENURE HAVE BEEN IDENTIFIED. THIS REPORT ANALYZES THOSE DATA AND PRESENTS CONCLUSIONS AND OBSERVATIONS.

2.0 CHRONOLOGY OF SITE OWNERS AND OPERATORS

THE PRIMARY BASIS FOR POTENTIAL CERCLA ACTION WITH RESPECT TO FOUNDRY COVE IS THE PRESENCE OF REMAINING DEPOSITS OF HEAVY METALS WITHIN THE BOTTOM SEDIMENTS OF THE COVE, AND THEIR POTENTIAL FOR RELEASE. POTENTIAL RECEPTORS INCLUDE THE AQUATIC ENVIRONMENT OF THE COVE AND THE HUDSON RIVER, AS WELL AS POTENTIAL UPTAKE INTO

THE FOOD CHAIN. OF THE SEVERAL HEAVY METALS REPORTED TO EXIST IN THE COVE SEDIMENTS, CADMIUM IS THE CONTAMINANT OF CONCERN. THIS EVALUATION, THEREFORE, WAS BASED UPON THE PROBABLE SOURCE AND MAGNITUDE OF THE CADMIUM METAL CONTAMINATION OF FOUNDRY COVE SEDIMENT DEPOSITS.

THE PREDOMINANT, AND PROBABLY THE SOLE, SOURCE OF CADMIUM CONTAMINATION IN FOUNDRY COVE WAS A NICKEL-CADMIUM BATTERY MANUFACTURING FACILITY WHICH OPERATED IN COLD SPRING FROM 1953 TIL MARCH, 1979. THE OWNERSHIP AND/OR OPERATION OF THE PLANT DURING THIS PERIOD IS SUMMARIZED AS FOLLOWS:

2.1 ARMY SIGNAL CORPS/SONOTONE - THE PLANT WAS BUILT BY THE U.S. ARMY CORPS OF ENGINEERS FOR THE ARMY SIGNAL CORPS IN 1952, WITH EQUIPMENT INSTALLATION AND START-UP EARLY IN 1953. THE PLANT WAS OPERATED UNDER A CONTRACT DATED JUNE 17, 1952 (AMENDED AUGUST 7, 1958) BETWEEN THE SIGNAL CORPS AND SONOTONE CORPORATION. THE FIRST BATTERIES WERE MANUFACTURED FOR THE SIGNAL CORPS AND WERE USED IN THE NIKE MISSILE PROGRAM. PEAK PRODUCTION FOR THIS USE WAS REACHED IN 1953, WITH PRODUCTION OF THESE BATTERIES CONTINUING INTO AT LEAST 1955. SUBSEQUENT CONTRACTS FOR BATTERY PRODUCTION AT THE PLANT INCLUDED BATTERIES FOR THE FAILSAFE SYSTEM ON WARHEADS FOR THE ATOMIC ENERGY COMMISSION, AND VARIOUS POWER SUPPLIES USED IN OTHER MISSILE PROGRAMS. IN 1957, THE PLANT BEGAN TO PRODUCE AIRCRAFT BATTERIES FOR MILITARY JET FIGHTERS. PEAK CAPACITY IN THIS SERVICE WAS REACHED AROUND 1959, WHICH WAS ALSO PROBABLY THE HIGHEST PRODUCTION YEAR FOR THE PLANT. DURING THIS PERIOD, SONOTONE OPERATED THE FACILITY EXCLUSIVELY FOR THE PRODUCTION OF MILITARY BATTERIES, AND NO COMMERCIAL PRODUCTS WERE MANUFACTURED.

2.2 SONOTONE - ON SEPTEMBER 12, 1962 SONOTONE PURCHASED THE PLANT AND ITS EQUIPMENT, ADDED 35,000 SQUARE FEET OF PRODUCTION AREA IN 1963, AND BEGAN PRODUCING NICKEL CADMIUM BATTERIES FOR COMMERCIAL CUSTOMERS. THIS ULTIMATELY INCLUDED A CONTRACT WITH IBM TO MANUFACTURE A LINE OF "SEALED CELL" BATTERIES. PRODUCTION CONTINUED TO INCREASE DURING THE 60'S, WITH THE MAXIMUM PRODUCTION RATE UNDER SONOTONE'S OWNERSHIP REACHED IN 1966.

2.3 CLEVITE - ALTHOUGH THERE IS SOME INDICATION THAT CLEVITE MAY HAVE PURCHASED THE PLANT DURING THE MID-1960'S, NO EVIDENCE WAS FOUND OF THE DATE OR TERMS OF SUCH A TRANSACTION UNTIL SONOTONE BECAME A WHOLLY OWNED SUBSIDIARY OF CLEVITE ON DECEMBER 27, 1967. ASSUMING THAT DATE INITIATED THEIR OWNERSHIP, CLEVITE OPERATED THE SITE FOR JUST OVER 18 MONTHS AT A CAPACITY OF LESS THAN HALF OF THE 1966 PRODUCTION RATE.

2.4 GOULD - ON JULY 21, 1969, CLEVITE MERGED WITH GOULD, INC. GOULD WAS REQUIRED TO DIVEST ITSELF OF THE COLD SPRING OPERATION BECAUSE OF ITS OTHER BATTERY HOLDINGS. THE FACILITY WAS OPERATED UNDER GOULD'S MANAGEMENT FOR ONLY ABOUT A WEEK, WITH GOULD BEING THE SURVIVING CORPORATION OF SONOTONE AND CLEVITE INTERESTS.

2.5 MARATHON - ON JULY 28, 1969, GOULD, CLEVITE, AND SONOTONE SOLD THE COLD SPRINGS PLANT TO BUSINESS FUNDS, INC., WHICH LATER CHANGED THE NAME OF THE FACILITY TO MARATHON BATTERY COMPANY. MARATHON INCREASED PRODUCTION OF THE PLANT TO NEAR ITS CAPACITY, AND EXPANDED THE ASSEMBLY OPERATIONS BY CONSTRUCTING A PLANT IN WACO, TEXAS. ULTIMATELY ALL REMAINING BATTERY MANUFACTURING OPERATIONS WERE TRANSFERRED TO THE WACO PLANT, WITH THE LAST "WET PROCESSING" OPERATIONS PERFORMED IN COLD SPRING DURING MARCH, 1979. THE PLANT WAS OWNED, BUT NOT OPERATED BY MARATHON SUBSEQUENT TO THAT DATE UNTIL LATE 1980.

2.6 MERCHANDISE DYNAMICS - THE FACILITY, WITH PROCESSING EQUIPMENT REMOVED, WAS PURCHASED BY MERCHANDISE DYNAMICS, INC. ON NOVEMBER 14, 1980 FOR USE AS A BOOK STORAGE FACILITY. MERCHANDISE DYNAMICS REMAINS THE PRESENT OWNER OF THE SITE, AND HAS CONDUCTED NO OPERATIONS WHICH WOULD GENERATE AN EFFLUENT CONTAINING CADMIUM.

3.0 NATURE OF COVE CONTAMINATION

3.1 DESCRIPTION OF MANUFACTURING PROCESS - THROUGHOUT THE FACILITY'S ACTIVE LIFE, THE SAME BASIC PRODUCTION PROCESS WAS UTILIZED. SINTERED NICKEL PLAQUES WERE PREPARED OFF-SITE. THE NEGATIVE PLAQUES WERE THEN IMPREGNATED WITH CADMIUM, UTILIZING A SEMI-CONTINUOUS DIP SYSTEM WHICH SEQUENTIALLY SOAKED THE PLAQUES IN CADMIUM NITRATE SOLUTION; DRIED THE PLAQUES IN AN OVEN TO DEPOSIT CADMIUM IN THE SINTER; NEUTRALIZED THE NITRATES IN A CAUSTIC SOAK; PROVIDED A WATER WASH OF THE PLAQUES; AND, DRIED THE PROCESSED PLAQUES IN AN OVEN. FOLLOWING THIS SEQUENCE OF OPERATIONS, REPRESENTATIVE PLAQUES WERE CHECKED FOR PROPER "WEIGHT GAIN" TO SATISFY THE QUALITY CONTROL SPECIFICATION, AND EITHER RECYCLED THROUGH THE "IMPREGNATION AND SOAK (I&S)"

PROCESS OR, WHEN COMPLETED, DIVERTED TO ASSEMBLY OPERATIONS. LIQUID WASTES FROM THIS PROCESS INCLUDED SPENT CAUSTIC, WHICH WAS DISCHARGED AS IT BECAME CONTAMINATED WITH NITRATE AND/OR CARBONATE, WASHWATER, AND LEAKS AND DRIPS FROM THE VARIOUS DIP TANKS. ALL OF THIS EFFLUENT DRAINED INTO A PROCESS TRENCH SURROUNDING THE OPERATION, AND WAS CONVEYED TO A CENTRAL SUMP FOR COLLECTION ALONG WITH NON-CADMIUM CONTAINING EFFLUENT FROM THE POSITIVE PLAQUE AREA AND OTHER PROCESS WASTEWATERS. THIS WASTEWATER EXHIBITED A HIGH PH (12 TO 14) BECAUSE OF THE LARGE AMOUNT OF CAUSTIC INTRODUCED FROM THE RINSEWATER, AS WELL AS THE SPENT CAUSTIC DISCHARGES. SINCE NICKEL AND CADMIUM ARE ONLY SLIGHTLY SOLUBLE AT THIS PH RANGE, MOST OF THE RESULTING METALLIC HYDROXIDES EXISTED AS SUSPENDED SOLIDS IN THE EFFLUENT. APPROXIMATELY 0.15 MG/L OF SOLUBLE CADMIUM WAS INCLUDED IN THE MIXED STREAM, WITH THIS LEVEL OF SOLUBILITY ATTRIBUTED TO THE "COMMON ION" EFFECT OF THE NUMEROUS DISSOLVED SPECIES IN THE EFFLUENT SOLUTION. THE NEGATIVE I&S PROCESS CONTRIBUTED APPROXIMATELY 1/3 OF THE TOTAL WASTEWATER EFFLUENT, WHICH RANGED IN QUANTITY FROM 100,000 TO 200,000 GALLONS PER DAY, DEPENDING UPON PRODUCTION RATES.

3.2 WASTEWATER MANAGEMENT - UNLIKE THE PRODUCTION PROCESS, THE WASTEWATER MANAGEMENT FACILITIES UNDERWENT NUMEROUS CHANGES, CULMINATING IN MARATHON'S SUCCESSFUL OPERATION AND OPTIMIZATION OF A TRUE WASTEWATER TREATMENT FACILITY SHORTLY AFTER MARATHON BEGAN OPERATION OF THE PLANT. THE HISTORY OF WASTEWATER MANAGEMENT AT THE PLANT IS SUMMARIZED AS FOLLOWS:

3.2.1 1952 - 1965 - THE "WASTEWATER TREATMENT SYSTEM", DESIGNED AND INSTALLED BY THE CORPS OF ENGINEERS, ORIGINALLY CONSISTED OF A LIFT STATION AND PIPING FOR TRANSFER OF ALL PROCESS WASTEWATER INTO THE COLD SPRINGS SEWER SYSTEM, FOR DISCHARGE DIRECTLY INTO THE HUDSON RIVER. IN ADDITION, A BYPASS VALVE WAS INSTALLED SO THAT WHEN THE LIFT STATION WAS SHUT DOWN OR OVERLOADED, A DIRECT GRAVITY DISCHARGE COULD BE MADE INTO A STORM SEWER. THIS SEWER WAS LOCATED WITHIN AN EASEMENT GRANTED BY OLD FOUNDRY CORPORATION FOR DISCHARGE INTO FOUNDRY COVE. BYPASSES INTO THIS STORM SEWER SYSTEM WERE FREQUENTLY NECESSARY BECAUSE THE HIGH DISSOLVED SOLIDS AND PH OF THE EFFLUENT RESULTED IN EXTREME FOULING WITHIN THE PUMP AND PIPING, AS WELL AS EROSION OF THE PUMP AND IMPELLER CASE. AS THE CAPACITY OF THE PUMP WAS REDUCED BY THESE EFFECTS, IT COULD NOT HANDLE THE WASTEWATER FLOW (ESPECIALLY DURING PEAK PRODUCTION), AND ULTIMATELY THE PUMPS REQUIRED SHUT DOWN AND MAINTENANCE OR REPLACEMENT. TO ACCOMMODATE PEAK FLOWS, THEREFORE, AND DURING PUMP MAINTENANCE, THE BY-PASS VALVE WAS OPENED AND THE FLOW DIVERTED TO FOUNDRY COVE. AVAILABLE INFORMATION INDICATES THAT THIS OCCURRED AT LEAST TWICE WEEKLY FOR PERIODS OF TIME RANGING FROM A FEW HOURS TO A FULL OPERATING SHIFT, WHICH WAS EQUIVALENT TO APPROXIMATELY 10% OF THE PLANT OPERATING CYCLE.

3.2.2 1966 - JULY, 1969 - DURING 1965, THE NEW YORK STATE DEPARTMENT OF HEALTH BEGAN INSPECTING THE VILLAGE OF COLD SPRING'S SANITARY SEWER DISCHARGE, AND DECIDED TO PREPARE FOR LITIGATION AGAINST THE VILLAGE SINCE NO TREATMENT OF ITS SANITARY SEWAGE WAS PROVIDED. THE VILLAGE HIRED A CONSULTANT WHO BEGAN DESIGNING A SEWAGE TREATMENT PLANT, AND WHO CONCLUDED THAT THE SONOTONE PROCESS EFFLUENT COULD NOT BE MANAGED BY THE VILLAGE'S SANITARY SEWER SYSTEM. FOR THAT REASON, AND IN ANTICIPATION OF ULTIMATELY INSTALLING A TREATMENT PLANT, THE VILLAGE OF COLD SPRING ORDERED SONOTONE TO DISCONNECT FROM THE VILLAGE'S SANITARY SEWER IN ABOUT NOVEMBER OF 1965. TO ACCOMPLISH THIS DIRECTIVE, SONOTONE SHUT DOWN THE DIVERSION PUMPS AND BYPASSED THE TOTAL WASTEWATER FLOW INTO THE STORM SEWER TO FOUNDRY COVE. SONOTONE THEN ENGAGED HYDRONICS, INC. TO EVALUATE THEIR PROCESS WASTEWATER AND DEVELOP A TREATMENT SYSTEM TO MAKE THE EFFLUENT ACCEPTABLE FOR DISCHARGE. THE FINAL HYDRONICS PROPOSAL WAS BASED UPON AN ELECTROLYTIC CAUSTIC RECOVERY SYSTEM, METAL HYDROXIDE PRECIPITATION AND CLARIFICATION, AND PH ADJUSTMENT BY SULFURIC ACID ADDITION. ALL OF THIS EQUIPMENT WAS ULTIMATELY INSTALLED AT THE COLD SPRING PLANT. REQUIRED CONSTRUCTION AND DISCHARGE PERMIT APPLICATIONS WERE FILED WITH THE APPROPRIATE AGENCIES.

THE REMAINING DIFFICULTY IN FINAL APPROVAL OF PLANS INVOLVED THE PROPOSED DISCHARGE ROUTE FOR TREATED EFFLUENT. THE STATE WOULD NOT PERMIT THE CONTINUED DISCHARGE INTO FOUNDRY COVE AS IT WAS PIPED, BUT SUGGESTED A "DISPERSION PIPE" TO BE LAID WELL INTO FOUNDRY COVE. OLD FOUNDRY CORPORATION WOULD NOT GRANT AN EASEMENT FOR THIS PURPOSE, HOWEVER, SO THE PLANT (WHICH WAS OWNED BY CLEVITE BY THAT TIME) REQUESTED RECONNECTION TO THE COLD SPRING SEWER SYSTEM. MEANWHILE, ALTHOUGH THE BULK OF THE PLANT'S WASTEWATER TREATMENT SYSTEM HAD BEEN INSTALLED, IT WAS NOT SUCCESSFULLY OPERATED, AND THE DISCHARGE CONTINUED TO FOUNDRY COVE. A DEADLINE TO ACHIEVE FULL COMPLIANCE BY JANUARY 1, 1970 WAS PLACED UPON THE PLANT BY THE STATE HEALTH DEPARTMENT.

3.2.3 AUGUST, 1969 - NOVEMBER, 1971 - WHEN MARATHON BEGAN OPERATION OF THE PLANT IN AUGUST OF 1969, IT HAD NO KNOWLEDGE OF ANY ENVIRONMENTAL PROBLEMS ASSOCIATED WITH THE WASTEWATER DISCHARGES FROM THE PLANT. ON

SEPTEMBER 25, 1970 THE LAWSUIT WAS FILED AGAINST MARATHON BATTERY, IN WHICH THE FEDERAL GOVERNMENT REQUESTED THAT THE COURT ORDER THAT DISCHARGE OF HEAVY METALS INTO FOUNDRY COVE CEASE AND THAT DEPOSITS OF CADMIUM AND OTHER METALS WHICH HAD BEEN ACCUMULATING OVER THE PREVIOUS 17 YEARS OF OPERATION BE REMOVED FROM FOUNDRY COVE. (FORMER OWNERS AND OPERATORS OF THE PLANT WERE JOINED AS DEFENDANTS IN THAT LITIGATION.). AT ABOUT THE SAME TIME, BOTH THE STATE OF NEW YORK AND THE EPA ISSUED PERMITS THAT INCLUDED COMPLIANCE SCHEDULES FOR REDUCING CONTAMINANT CONCENTRATIONS IN THE TREATED WASTEWATER TO EXTREMELY LOW LEVELS. COMPLIANCE WITH THESE VARIOUS DIRECTIVES WAS ACHIEVED BY MARATHON AS FOLLOWS:

A. WASTEWATER FLOW DIVERSION - ALTHOUGH THE EFFLUENT FLOW MAY HAVE BEEN DIVERTED TO VARIOUS OF THE VILLAGE SEWER SYSTEMS BEGINNING ABOUT OCTOBER, 1970, THE FINAL CONNECTION TO BY-PASS THE SANITARY SEWER AND FLOW DIRECTLY INTO THE HUDSON RIVER VIA THE VILLAGE STORM SEWER WAS MADE PRIOR TO DECEMBER, 1971, AND NO PROCESS EFFLUENT WAS ALLOWED TO ENTER FOUNDRY COVE AFTER THAT DATE.

B. HEAVY METAL REMOVAL - THE METAL HYDROXIDE CONTROL EQUIPMENT WAS OPTIMIZED AND EXPANDED DURING 1970 AND 1971, AND A SELECTIVE DE-IONIZATION UNIT WAS ADDED AS A "POLISHING DEVICE" FOR THE STREAM PRIOR TO DISCHARGE. THE INITIAL IMPROVEMENTS WERE SUCCESSFUL IN REDUCING THE CADMIUM CONCENTRATION TO ITS SOLUBILITY LEVEL, RESULTING IN THE VIRTUAL ELIMINATION OF INSOLUBLE CADMIUM FROM THE EFFLUENT. THE DEIONIZATION SYSTEM ULTIMATELY REMOVED A PORTION OF THE SOLUBLE METAL.

C. DREDGING - THREE AREAS OF FOUNDRY COVE WERE DREDGED TO REMOVE EXCESSIVE CADMIUM DEPOSITS DURING 1972 AND 1973, WITH THE TREATED DREDGE SPOILS LANDFILLED ON THE PLANT SITE.

3.3 COVE CONTAMINATION CONTRIBUTIONS - BASED UPON THE INFORMATION DISCUSSED UNDER SECTIONS 3.1 AND 3.2 REGARDING OWNERSHIP/OPERATION AND WASTEWATER MANAGEMENT, TOGETHER WITH ADDITIONAL PRODUCTION INFORMATION, THE RELATIVE CONTRIBUTIONS OF CADMIUM TO THE COVE SEDIMENTS CAN BE ESTIMATED.

3.3.1 CALCULATION TECHNIQUE - THE AMOUNT OF CADMIUM WASTE PRODUCED BY THE PLANT IS RELATED TO THE CADMIUM NITRATE USAGE, WHICH IS IN TURN A FUNCTION OF PLANT PRODUCTION RATE. PLANT PRODUCTION MAY BE DETERMINED FROM TWO BASES OF AVAILABLE DATA:

A. ACTUAL BATTERY PRODUCTION RATES IN TERMS OF CELLS, BATTERIES, OR "AMPERE-HOURS" FOR YEARS WHEN THOSE DATA ARE AVAILABLE.

B. FOR A FEW INTERVENING YEARS WHEN THOSE DATA ARE NOT AVAILABLE, OR OTHER DATA SUCH AS EMPLOYMENT LEVEL, PERCENTAGE OF PLANT CAPACITY, WATER USAGE, ETC. WERE CORRELATED TO THE PRODUCTION RATE.

OF THE CADMIUM NITRATE USED, APPROXIMATELY 20% ENTERED THE WASTEWATER SYSTEM. THIS FIGURE IS DERIVED FROM DESIGN STUDIES FOR THE POLLUTION CONTROL HARDWARE. THE AMOUNT OF CADMIUM DISCHARGED TO THE COVE, AS THE HYDROXIDE, THEN IS CALCULATED TAKING INTO ACCOUNT THE AMOUNT OF TIME DISCHARGE WAS DIRECTLY TO THE COVE AND THE AMOUNT OF HYDROXIDE REMOVED, ONCE THE TREATMENT SYSTEM WAS IMPLEMENTED. GIVEN THE SOLUBILITY OF CADMIUM IN THE EFFLUENT WAS APPROXIMATELY 0.15 MG/L, THE NET LOAD OF CADMIUM TO THE COVE IS THE DIFFERENCE BETWEEN TOTAL CADMIUM DISCHARGED AND SOLUBLE CADMIUM.

3.3.2 LOADING TO COVE - BASED UPON THE DATA DESCRIBED ABOVE, THE ESTIMATED CADMIUM DISCHARGES TO THE COVE ASSOCIATED WITH THE VARIOUS OWNERS OR OPERATORS WAS DEVELOPED. IN ORDER TO TAKE CHANGES OF OWNERSHIP, OPERATIONAL RESPONSIBILITY, AND WASTEWATER MANAGEMENT PROCEDURES INTO ACCOUNT, THE HISTORY OF PLANT OPERATIONS WAS DIVIDED INTO CHRONOLOGICAL PERIODS OF APPROXIMATELY ONE YEAR DURATION. BEGINNING AND ENDING MONTHS OF THESE PERIODS REFLECT IMPORTANT EVENTS THAT AFFECTED CADMIUM LOADING TO THE COVE OR PLANT OWNERSHIP. A SUMMARY OF THE CADMIUM DISCHARGES TO THE COVE IS GIVEN IN TABLE 1 AS FOLLOWS (SEE TABLE 1):

AS SHOWN BY TABLE 1, NO CADMIUM LOADING ALLOCATION WAS DETERMINED AFTER 1970 BECAUSE:

A. ONLY SOLUBLE CADMIUM WAS CONTAINED IN THE EFFLUENT DURING 1971 THROUGH NOVEMBER.

B. THE TOTAL EFFLUENT WAS DIVERTED TO THE COLD SPRING SEWER BEGINNING NOVEMBER, 1971, AND NO BY-PASS WAS MADE TO FOUNDRY COVE.

3.3.3 OVERALL LOADING ALLOCATION - A SUMMARY OF THE ESTIMATED CADMIUM LOADING BY EACH OF THE OWNER/OPERATORS IS OUTLINED IN TABLE 2, INCLUDING SPECIFIC DESIGNATION OF THE PORTION OF SONOTONE'S PLANT OPERATION FOR THE U.S. ARMY SIGNAL CORPS. THESE RESULTS ARE GIVEN AS FOLLOWS (SEE TABLE 2):

3.4 CADMIUM REMOVAL FROM COVE SEDIMENTS

3.4.1 DREDGING - AS DISCUSSED UNDER SECTION 3.2.3, ONE OF THE PROVISIONS OF THE FINAL JUDGMENT RESULTING FROM THE 1970 LITIGATION REQUIRED DREDGING OF CADMIUM-BEARING SEDIMENTS FROM FOUNDRY COVE. THE BASIS FOR DECONTAMINATION VERIFICATION WAS ESTABLISHED AT A MAXIMUM VOLUMETRIC CADMIUM CONCENTRATION OF 900 PPM IN AREAS KNOWN AS: THE OUTFALL AREA ADJACENT TO THE DISCHARGE PIPE; THE CHANNEL WHICH LEADS TO THE MAIN BODY OF THE COVE; AND, A PORTION OF THE COVE. THIS WAS ACCOMPLISHED BY HYDRAULIC DREDGING, WHICH WAS CONDUCTED BETWEEN SEPTEMBER, 1972 AND JULY 15, 1973, WITH THE DEWATERED DREDGE SPOILS ULTIMATELY LANDFILLED ON PLANT PROPERTY. A TOTAL OF APPROXIMATELY 5,000 CU. YDS. OF DEWATERED SEDIMENTS WERE REMOVED UNDER THIS PROGRAM, CONTAINING APPROXIMATELY 12,000 POUNDS OF CADMIUM METAL. IN RESPONSE TO THE REPORT FILED WITH THE COURT ON BEHALF OF THE DEFENDANTS BY THE GOVERNMENT-SELECTED EXPERT, THE UNITED STATES, IN ACCORDANCE WITH THE FINAL JUDGMENT, FILED A "SATISFACTION OF JUDGMENT," STATING "THE DEFENDANTS ... ARE DEEMED TO HAVE COMPLIED WITH THE TERMS OF THE FINAL JUDGMENT, AS AMENDED, WITH RESPECT TO THE REMOVAL OF THE DEPOSITS OF CADMIUM FROM FOUNDRY COVE AND ARE RELIEVED FROM ANY FURTHER OBLIGATION WITH RESPECT THERETO.".

3.4.2 DISPERSION - VARIOUS STUDIES HAVE BEEN CONDUCTED ON THE FOUNDRY COVE CADMIUM PROBLEM EXTENDING PRIOR TO, DURING, AND AFTER THE DREDGING ACTIVITIES. THE MOST DEFINITIVE OF THESE STUDIES WITH RESPECT TO DISPERSION OF CADMIUM FROM THE SEDIMENTS INTO THE AQUATIC ENVIRONMENT WERE PREPARED BY HAZEN AND KNEIP DURING THE PERIOD OF 1974 TO 1978. DURING THE PERIOD IMMEDIATELY FOLLOWING DREDGING ACTIVITIES, THE NET INCREASE IN TIDAL WATER CONCENTRATION OF CADMIUM RESULTED IN AN ESTIMATE OF 2,600 POUNDS/YEAR OF METAL DISPERSION INTO THE HUDSON RIVER. IN YEARS FOLLOWING 1976, THIS AMOUNT HAS APPARENTLY BEEN REDUCED TO ABOUT 600 POUNDS/YEAR. THE DISPERSION OF CADMIUM INTO THE AQUATIC ENVIRONMENT CAN BE CALCULATED ON AN ANNUAL BASIS, BASED UPON A RATIO OF MEASURED DISPERSION TO TOTAL DEPOSITION. THE BASELINE YEAR FOR THIS ESTIMATE WILL BE THE DATA DEVELOPED DURING 1974, SINCE THE REDISTRIBUTION DUE TO DREDGING ACTIVITIES WOULD APPROXIMATE THE DEPOSITION DURING CONTINUED DISCHARGE. FROM THOSE 1974 DATA, A DISPERSION RATE FROM ACTIVE DEPOSITS WAS CALCULATED TO BE 2.5% OF THE NET DEPOSITION. A REDUCTION IN DISPERSION TO 0.8% OF THE DEPOSITED CADMIUM HAS OCCURRED SINCE THAT YEAR, DURING WHICH THE SEDIMENTS HAVE NOT BEEN DISTURBED. NET CADMIUM DEPOSITED IN THE COVE IS CALCULATED BASED UPON LOADING, LESS SOLUBLE AND DISPERSED CADMIUM, AS SHOWN IN TABLE 3 (SEE TABLE 3):

BASED UPON THE PRESENT REDUCED RATES OF CADMIUM DISPERSION INTO COVE WATERS, PRESUMABLY RESULTING FROM A REDUCTION IN SEDIMENT SURFACE CONCENTRATIONS, THE EXPECTED "HALF LIFE" FOR THE CADMIUM DEPOSITS IS 86.3 YEARS. THE RESULTING CONCENTRATION OF CADMIUM IN THE COVE WATER, HOWEVER, IS ONLY 2.8 UG/L, COMPARED TO THE DRINKING WATER STANDARD OF 10 UG/L. AS SUCH, THERE WOULD NOT APPEAR TO BE A MEASURABLE RISK TO COVE WATERS IF THE CADMIUM SEDIMENTS WERE ALLOWED TO DISPERSE OVER A LONG PERIOD OF TIME. CONVERSELY, THERE WAS A MEASURABLE IMPACT UPON COVE WATER QUALITY DURING THE DREDGING OPERATIONS, AS WELL AS FOR SOME PERIOD THEREAFTER, RESULTING FROM THE REDISTRIBUTION OF THE CONTAMINATED RESIDUES TO THE SURFACE OF THE COVE SEDIMENTS.

4.0 CONCLUSIONS AND OBSERVATIONS

OF NECESSITY, THIS EVALUATION OF HISTORICAL FILES AND TECHNICAL DATA WAS NOT EXHAUSTIVE, BECAUSE OF THE CONSTRAINT OF TIME REQUIRED TO SUBMIT A PRELIMINARY REPORT BY AUGUST 1. THIS REPORT, HOWEVER, HAS PROVIDED DATA SUFFICIENT TO DRAW VARIOUS CONCLUSIONS RELATIVE TO COVE.

A SUMMARY OF THESE CONCLUSIONS AND MISCELLANEOUS OBSERVATIONS ARE AS FOLLOWS:

4.1 SUFFICIENT PRODUCTION AND WASTEWATER MANAGEMENT DATA ARE AVAILABLE FOR THE ENTIRE OPERATIONAL HISTORY OF THE COLD SPRING BATTERY PLANT TO DEFINE THE MAGNITUDE AND RELATIVE CADMIUM CONTRIBUTION BY EACH OWNER/OPERATOR TO THE COVE, AS SHOWN BY TABLE 2. USING THE TECHNIQUE DESCRIBED IN THIS REPORT, APPROXIMATELY 35 TONS OF METALLIC CADMIUM ARE CALCULATED TO REMAIN IN FOUNDRY COVE. SINCE THIS QUANTITY IS IN THE RANGE OF ESTIMATES DERIVED FROM STATISTICAL SAMPLING AND ANALYSIS OF THE COVE BY VARIOUS INVESTIGATORS, IT APPEARS THAT THIS ANALYSIS OF DEPOSITION AND DISPERSION HAS RESULTED IN CONCLUSIONS CONSISTENT WITH ALL AVAILABLE DATA.

4.2 SOME DISCHARGES OF CADMIUM TO THE COVE OCCURRED DURING PERIODS OF WASTEWATER BY-PASS IMMEDIATELY AFTER THE U.S. ARMY COMPLETED CONSTRUCTION, AND SONOTONE INITIATED OPERATION OF THE PLANT. THE MOST SIGNIFICANT DEPOSITION OF CADMIUM INTO THE COVE OCCURRED DURING THE PERIOD OF APPROXIMATELY FOUR YEARS, DURING WHICH THE ENTIRE PLANT WASTEWATER WAS DISCHARGED TO THE COVE WITHOUT TREATMENT. SONOTONE AND CLEVITE WERE THE OWNERS AND OPERATORS OF THE FACILITY DURING THAT TIME. DURING THE TIME MARATHON OPERATED THE PLANT, CADMIUM DISCHARGES TO THE COVE WERE QUICKLY REDUCED TO SOLUBLE LEVELS, AND DISCHARGE TO FOUNDRY COVE WAS ENTIRELY ELIMINATED AFTER ABOUT TWO YEARS OF OPERATION.

4.3 THE COURT-ORDERED REMEDIAL ACTION RESULTED IN THE REMOVAL OF APPROXIMATELY 12,000 POUNDS OF CADMIUM FROM THE COVE, WITH ULTIMATE DISPOSAL IN A SECURE LANDFILL, THE DESIGN AND CONSTRUCTION OF WHICH WERE APPROVED AND PERMITTED BY THE APPROPRIATE ENVIRONMENTAL AGENCIES. THIS PROGRAM HAD THE NET EFFECT OF REMOVING APPROXIMATELY FOUR TIMES AS MUCH CADMIUM FROM THE COVE AS COULD BE ATTRIBUTED TO MARATHON PLANT OPERATION.

4.4 THE NATURAL DISPERSION OF CADMIUM FROM THE SEDIMENTS RESULTS IN A CONCENTRATION OF CADMIUM IN COVE WATER WHICH IS SIGNIFICANTLY LOWER THAN THE DRINKING WATER STANDARDS. REDISTRIBUTION OF SEDIMENTS DURING DREDGING ACTIVITIES HAD THE EFFECT OF INCREASING COVE WATER CADMIUM CONCENTRATIONS TO LEVELS ABOVE DRINKING WATER STANDARDS FOR AT LEAST A PERIOD OF TWO YEARS. THE AMOUNT OF CADMIUM ACTUALLY REMOVED WOULD BE EQUIVALENT TO NATURAL DISPERSION OF CADMIUM FROM THE SEDIMENTS OVER A 20 YEAR PERIOD. THESE DATA SUGGEST THAT AN ATTEMPT TO REMOVE CADMIUM BY DREDGING WOULD RESULT IN SHORT TERM ADVERSE EFFECTS ON THE COVE THAT COULD BE AVOIDED BY ALLOWING NATURAL DISPERSION FROM THE SEDIMENTS OVER A LONGER PERIOD OF TIME.

NATIONAL AUDUBON SOCIETY

SEPTEMBER 5, 1986

RAMANAND PERGADIA, P.E.
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
REGION 3
21 SOUTH PUTT CORNERS ROAD
NEW PALTZ, NY 12561

DEAR MR. PERGADIA:

AS MANAGER OF NATIONAL AUDUBON SOCIETY'S CONSTITUTION MARSH SANCTUARY, I WISH TO RESPOND TO SEVERAL POINTS IN YOUR LETTER OF AUGUST 18, 1986, TO JOEL SINGERMAN, REGARDING THE DRAFT SUPPLEMENTAL RI/FS REPORTS SUBMITTED BY EBASCO FOR THE MARATHON BATTERY SITE. I FIND IT DISTURBING THAT I WAS NOT CONSULTED DURING THE FORMULATION OF YOUR COMMENTS AND THAT I WAS NOT EVEN PROVIDED WITH A COPY OF THOSE COMMENTS.

NATIONAL AUDUBON SOCIETY ASSUMED MANAGEMENT RESPONSIBILITIES FOR CONSTITUTION MARSH IN 1970 AND IMMEDIATELY INSTITUTED PROCEEDINGS WITH THE UNITED STATES ATTORNEY FOR A RESOLUTION OF THE HEAVY METAL CONTAMINATION OF FOUNDRY COVE, WHICH HAD FIRST BEEN DISCOVERED BY THE NATURAL RESOURCES DEFENSE COUNCIL. THE COURT ACTIONS WHICH FOLLOWED LED TO A PARTIAL DREDGING OF FOUNDRY COVE IN THE EARLY 1970'S, WHICH WAS UNSUCCESSFUL. SINCE THAT TIME, NATIONAL AUDUBON SOCIETY HAS COOPERATED FULLY WITH NUMEROUS RESEARCH ACTIVITIES ON THE SITE AND WITH THE CURRENT SUPERFUND STUDY WHICH HAS BEEN UNDERWAY FOR MORE THAN TWO YEARS. AT ITS OWN EXPENSE, NATIONAL AUDUBON SOCIETY HAS, OVER THE YEARS, COLLECTED NUMEROUS SPECIMENS FOR HEAVY METAL ANALYSES AND HAS CONTINUED TO WORK FOR A SUCCESSFUL REMEDIATION OF THE AREA. WE HAVE TWO PRIMARY CONCERNS. FIRST, WE ARE CONCERNED WITH POTENTIAL HUMAN HEALTH IMPACTS ON PEOPLE WHO CONSUME CRABS, FISH AND WATERFOWL FROM THE AREA AND SECOND, WE ARE ESPECIALLY CONCERNED WITH THE BIOLOGICAL AND ECOLOGICAL INTEGRITY OF CONSTITUTION MARSH. AS YOU MAY KNOW, CONSTITUTION MARSH IS ONE OF ONLY FIVE REMAINING SIZABLE TIDAL MARSHES ON THE HUDSON RIVER BELOW TROY.

THESE HAVE ALSO BEEN THE CONCERNS OF MANY OF YOUR COLLEAGUES FROM NYSDEC IN ALBANY WHO HAVE BEEN WORKING ON THIS ISSUE FOR MORE THAN A DECADE. FROM THEM WE HAVE RECEIVED CONSIDERABLE COOPERATION, EXCELLENT ADVICE AND MANY PROFESSIONAL COURTESIES. YOUR LETTER REFERENCED ABOVE IS THE FIRST SUBSTANTIAL INPUT I HAVE SEEN FROM NYSDEC REGION 3 AND WHILE I APPRECIATE YOUR INTEREST IN THE MARATHON BATTERY SITE, I BELIEVE IT IS INEXCUSABLY TARDY.

PLEASE PERMIT ME TO ADDRESS THE COMMENTS IN YOUR LETTER.

YOUR LETTER OF AUGUST 18 TO JOEL SINGERMAN: PAGE 1

1. I AM NOT SURE WHY YOU ARE RECOMMENDING IMMEDIATE REMOVAL OF THE HIGH CONTAMINATION SOURCES. THE EXTENT OF CONTAMINATION HAS BEEN KNOWN FOR MANY YEARS AND WHILE A HUMAN HEALTH THREAT EXISTS, NONE OF THE OTHER DOZENS OF PEOPLE INVOLVED IN THE MARATHON BATTERY SITE HAVE SUGGESTED IR. ALL AGREE THAT A CAREFULLY THOUGHT-OUT REMEDIAL ACTION IS CALLED FOR. FURTHER, YOU SUGGEST IR AT THE PLANT SITE, EVEN THOUGH THE PLANT SITE ITSELF (ALONG WITH WEST FOUNDRY COVE, THE HUDSON RIVER AND THE PIER) IS THE SUBJECT OF PHASE II OF THE CURRENT SUPERFUND STUDY. NOT NEARLY ENOUGH IS KNOWN AT PRESENT FOR IR TO OCCUR AT THE PLANT SITE. IN ADDITION, THE 1980 CERCLA LAW LIMITS IR ACTIONS TO NOT MORE THAN SIX MONTHS AND NOT MORE THAN $1 MILLION, WHICH CLEARLY IS INSUFFICIENT FOR THE IR ACTIVITIES YOU RECOMMEND. IN FACT, SINCE THE CERCLA LAW HAS YET TO BE REAUTHORIZED BY CONGRESS, NO ONE YET KNOWS WHAT FUNDS MIGHT BE AVAILABLE IN THE FUTURE. FINALLY, THERE IS AGREEMENT THAT THE TWO HOT SPOTS IN CONSTITUTION MARSH DO NOT POSE A HIGH-RISK HEALTH THREAT AND THAT THE WISEST COURSE OF ACTION IS TO LEAVE CONSTITUTION MARSH ALONE IN ORDER TO PRESERVE THE OVERRIDING IMPORTANCE OF THE ECOSYSTEM.

2. HERE YOU SUGGEST THAT WITH THE IR UNDERWAY, ADDITIONAL STUDIES BE CONDUCTED OF THE LARGER AREAS OF CONSTITUTION MARSH, THE HUDSON RIVER, ETC. AND THAT SUGGESTIONS FROM ALL PARTIES BE SOLICITED AND CONSIDERED. HOWEVER, ON THE NEXT PAGE (SUGGESTED CLEANUP METHODS 2)) YOU CALL FOR A TEN-YEAR REMEDIATION OF THE LARGER AREAS OF CONSTITUTION MARSH, APPARENTLY WITHOUT CONSIDERATION OF ANY OF THE STUDIES YOU CALLED FOR ON PAGE 1. THERE IS WIDESPREAD AGREEMENT AMONG ALL PARTIES THAT REMOVAL AND ATTEMPTED RESTORATION OF 100 ACRES OR MORE

OF CONSTITUTION MARSH WOULD ALMOST CERTAINLY LEAD TO DEGRADATION OF THE ENTIRE MARSH. THESE PARTIES EVEN INCLUDE ENGINEERS WHO ARE NORMALLY NOT EXPECTED TO FULLY UNDERSTAND THE COMPLEX ECOLOGICAL PROCESSES IN TIDAL WETLANDS. AS JUST ONE EXAMPLE OF WHAT CAN HAPPEN, ANY ATTEMPT TO RESTORE AS MUCH AS 100 ACRES OF CONSTITUTION MARSH WOULD ALMOST CERTAINLY RESULT IN THE INVASION OF PHRAGMITES AND PURPLE LOOSESTRIFE WHICH READILY INVADE DISTURBED WETLANDS. SINCE THE COST SIMPLY OF ATTEMPTING TO REPLANT CONSTITUTION MARSH WOULD BE PROHIBITIVELY EXPENSIVE, WEED CONTROL WOULD BE OUT OF THE QUESTION ON SUCH A LARGE AREA. WE WOULD THEN HAVE A 100-ACRE BED OF UNDESIRABLE EXOTIC WEEDS IN THE MARSH WHICH WOULD PROBABLY TAKE OVER THE ENTIRE 270 ACRES, THUS EFFECTIVELY DESTROYING ONE OF THE FINEST TIDAL MARSHES ON THE HUDSON. AUDUBON'S POSITION WILL THEREFORE CONTINUE TO BE THAT CONSTITUTION MARSH SHOULD BE LEFT STRICTLY ALONE AND THIS VIEW HAS BEEN UNIVERSALLY SUPPORTED PRIOR TO THE ARRIVAL OF YOUR LETTER. ONCE FOUNDRY COVE HAS BEEN CLEANED UP, CONSTITUTION MARSH (AS INDICATED BY EBASCO) SHOULD BE ABLE TO CLEANSE ITSELF THROUGH TIDAL FLUSHING AND NATURAL SEDIMENTATION.

3. WHILE IT IS TRUE THAT IN SOME WAYS THE HUDSON RIVER AND FOUNDRY COVE ARE INTIMATELY TIED TOGETHER, I BELIEVE IT IS A MISTAKE TO DEFER ANY FURTHER STUDIES UNTIL YOUR RECOMMENDED IR IS COMPLETE. FOR ONE THING, YOUR IR IS ACTUALLY THE SUGGESTED LONG TERM REMEDIAL ACTION AND WOULD TAKE YEARS TO ACCOMPLISH. FOR ANOTHER, THE CONTAMINATION IN THE HUDSON RIVER IS THOUGHT TO HAVE BEEN PRODUCED BY THE FIRST SIX YEARS' OPERATION OF THE BATTERY PLANT WHEN CADMIUM WASTES WERE PUMPED DIRECTLY INTO THE HUDSON RIVER THROUGH THE COLD SPRING STORM SEWER, DISCHARGING ADJACENT TO THE PIER. SINCE THE CONTAMINATED SEDIMENTS IN FOUNDRY COVE ARE RELATIVELY IMMOBILE AND ARE PROBABLY NOT ADDING SIGNIFICANTLY TO THE HUDSON RIVER BURDEN, IT MAKES LITTLE SENSE TO DEFER THE HUDSON RIVER STUDIES FOR SEVERAL REASONS. FOR ONE, WHILE PEOPLE DO NOT SWIM IN FOUNDRY COVE, THEY DO SWIM IN THE HUDSON RIVER, BOTH AT COLD SPRING AND AT A STATE PARK SWIMMING BEACH LESS THAN A MILE UPRIVER, AND MANY TONS OF CONTAMINATED WASTES ARE UNACCOUNTED FOR IN THE RIVER. THESE SHOULD BE FOUND AS QUICKLY AS POSSIBLE. FOR A SECOND REASON, THE COLD SPRING BOAT CLUB AND THE VILLAGE OF COLD SPRING WANT TO MAKE REPAIRS TO BOAT DOCKING FACILITIES AND SEA WALLS ON THE WATERFRONT AND ARE PREVENTED FROM DOING SO UNTIL THE CADMIUM PROBLEM IS RESOLVED. AS POINTED OUT SEVERAL TIMES BY EBASCO, THERE ARE MANY LOCAL CONCERNS REGARDING WATERFRONT USE, REPAIR AND PROPERTY VALUES WHICH SHOULD BE RESOLVED QUICKLY. THE LOCAL RESIDENTS ARE RUNNING OUT OF PATIENCE AND IT IS NOT FAIR TO ASK THEM TO WAIT SEVERAL MORE YEARS BEFORE STUDIES OF THE RIVER EVEN BEGIN.

YOUR LETTER OF AUGUST 18 TO JOEL SINGERMAN: PAGE 2

I AGREE WITH YOU THAT THE REVIEW PERIOD WAS SHORTER THAN WE WOULD LIKE BUT I DO NOT AGREE THAT THIS PROJECT IS SET ON A PRECIPITATE COURSE OF ACTION. IT MAY SEEM SO TO SOMEONE WHO HAS ENTERED THE PROJECT AT THIS LATE DATE, BUT THOSE OF US WHO HAVE BEEN INVOLVED WITH IT OVER THE PAST DECADE HAVE BEEN ABLE TO KEEP UP WITH DEVELOPMENTS. AN EXTREMELY PRODUCTIVE MEETING WAS HELD AT EPA'S REGION II HEADQUARTERS ON JULY 7 INVOLVING STATE AND FEDERAL PEOPLE, EBASCO AND OTHERS INTERESTED IN THE PROJECT WHERE MUCH OF THE FINAL THINKING WAS REFINED PRIOR TO PREPARATION OF THE DRAFT RI/FS. IT IS UNFORTUNATE YOU WERE UNABLE TO ATTEND. IN FACT, I BELIEVE YOUR SUGGESTION OF AN IMMEDIATE REMOVAL AS OUTLINED IN YOUR LETTER WOULD BE A PRECIPITATE COURSE OF ACTION. FURTHER, I BELIEVE THAT THE PRESENT FINAL RI/FS DOCUMENTS, WHILE NOT PERFECT, DO REFLECT THE VERY CONSIDERABLE AMOUNT OF SCIENTIFIC WORK THAT HAS BEEN ACCOMPLISHED OVER THE PAST 16 YEARS AT THE SITE. IN THE REFERENCES SECTION OF THE FINAL RI, I COUNT NO FEWER THAN 25 CITATIONS TO SCIENTIFIC PAPERS CONCERNED SOLELY WITH CADMIUM, NICKEL AND COBALT STUDIES IN FOUNDRY COVE AND I HAVE IN MY POSSESSION SCORES OF TECHNICAL MEMORANDA AND OTHER COMMUNICATIONS FROM NYSDEC IN ALBANY AND FURTHER KNOW OF AT LEAST FOUR GRADUATE THESES WHICH HAVE RESULTED FROM FOUNDRY COVE WORK. MANY PEOPLE IN COLD SPRING BELIEVE FOUNDRY COVE HAS BEEN STUDIED TO DEATH AND THAT NOW IS THE TIME FOR ACTION AND I TEND TO AGREE WITH THEM. IT IS CERTAIN THAT SEVERAL MILLION DOLLARS OF RESEARCH MONIES HAVE BEEN EXPENDED ON THE PROBLEM AND I THINK IT IS NOW TIME FOR A CAREFULLY PLANNED REMEDIAL ACTION TO BEGIN IN FOUNDRY COVE.

THERE IS SOME DIFFERENCE OF OPINION ON THE RISK ASSESSMENT AND THE CLEANUP LEVEL, BUT THERE IS GENERAL AGREEMENT THAT THE HOT SPOT CONCENTRATIONS IN CONSTITUTION MARSH DO NOT POSE AS MUCH THREAT AS THOSE IN FOUNDRY COVE ITSELF. FRANKLY, I WOULD PREFER TO SEE A CLEANUP LEVEL OF 10 MG/KG IN FOUNDRY COVE WHILE STILL LEAVING CONSTITUTION MARSH ALONE.

SUGGESTED CLEANUP METHODS (YOUR LETTER)

1) I AGREE, THAT EXCAVATION OF CONTAMINATED SEDIMENTS IS SUGGESTED, ESPECIALLY IN VIEW OF THE PROBABLE POOR

PERFORMANCE OF CONTAINMENT MATS (SO FAR UNTRIED IN SIMILAR SITES AND WITH A LIFESPAN OF ONLY 10 TO 20 YEARS.). HOWEVER I FIND YOUR SUGGESTION OF PLACING THE UNTREATED WASTES INTO SOME SORT OF CONTAINMENT STRUCTURE TO PROVIDE A LOCAL AMENITY SUCH AS A PIER OR CAUSEWAY (PRESUMABLY INTO THE HUDSON RIVER) LITTLE SHORT OF INCREDIBLE. WHAT SORT OF CONTAINMENT STRUCTURE DID YOU HAVE IN MIND? CONCRETE IS NO GOOD FOR LONG TERM STORAGE (AS THE STATE OF CRUMBLED DISREPAIR OF THE COLD SPRING DOCK ATTESTS), SHEET-PILING EVENTUALLY RUSTS, ETC. PERHAPS AS AN ENGINEER YOU KNOW OF SOME CONTAINMENT METHOD WHICH IN FACT WILL LAST FOREVER (BECAUSE CADMIUM, AS AN ELEMENT, WILL LAST FOREVER) AND PREVENT IT FROM LEACHING EVENTUALLY INTO THE RIVER. I DO NOT THINK THAT THE RESIDENTS OF COLD SPRING (OR EPA, FOR THAT MATTER) WILL THINK THEY HAVE BEEN DONE A FAVOR IF A NEW DOCK IS BUILT FOR THEM OUT OF CADMIUM WASTES FROM FOUNDRY COVE. EVEN FIXED THERE IS NO ASSURANCE THAT SUCH WASTES WILL REMAIN UNAVAILABLE TO BIOTA FOREVER. FURTHER, THE DREDGED MATERIALS WILL OCCUPY MORE THAN 120,000 CUBIC YARDS, WHICH WILL MAKE A LARGER PIER THAN COLD SPRING HAS ANY USE FOR. EXCAVATION SHOULD BE FOLLOWED BY REMOVAL OF ALL SEDIMENTS, FIXED OR NOT, FROM THE SITE AND THEIR DISPOSAL IN A SUITABLE LANDFILL.

2) I HAVE ALREADY ADDRESSED YOUR INCONSISTENT SUGGESTION OF FURTHER STUDY OF CONSTITUTION MARSH BUT TEN-YEAR REMOVAL.

2A) INLET AND OUTLET FLAP GATES AT THE RAILROAD TRESTLES HAVE BEEN REJECTED FOR SEVERAL REASONS. TWO OF THEM ARE: ONE) REDUCTION OF TIDAL FLOW, ESPECIALLY ON A LONG-TERM BASIS, COULD HAVE DISASTROUS IMPACTS ON CONSTITUTION MARSH, AND ONE OF THE PRIMARY AIMS OF THE REMEDIAL ACTION IS TO PREVENT ECOLOGICAL IMPACT ON CONSTITUTION MARSH AS IS STATED MANY TIMES IN THE EBASCO DOCUMENTS. TWO) THEY WOULDN'T WORK ANYWAY. THERE IS CONSIDERABLE TIDAL SEEPAGE BENEATH THE RAILROAD BALLAST, WHICH IS VERY PERMEABLE AND THE ENTIRE RAILROAD CAUSEWAY (MORE THAN A MILE LONG) WOULD HAVE TO BE DIKED IN ORDER TO ACHIEVE SUBSTANTIAL DEWATERING OF THE MARSH. IN ADDITION, WHETHER YOU LIKE THE ACID LEACH TEST PERFORMED BY EBASCO OR NOT, WATERS IN THE MARSH AND THE ADJACENT HUDSON RIVER ARE NOT SLIGHTLY ACID, BUT NEUTRAL, AND FREQUENTLY SLIGHTLY ALKALINE. I CONDUCTED A YEAR-LONG DAY AND NIGHT FISH STUDY IN CONSTITUTION MARSH AND SAMPLED PH AT BI-WEEKLY INTERVALS. PH RANGED FROM 6.8 TO 7.4 AND WAS MORE OFTEN THAN NOT SLIGHTLY ALKALINE, AS IS THE ENTIRE HUDSON RIVER, A FACT, INCIDENTALLY, WHICH MAKES IT SUCH GOOD STRIPED BASS HABITAT.

2B) POST-REMEDIAL MONITORING FOR 30 YEARS IS ALREADY A PART OF THE REMEDIAL ALTERNATIVES PROPOSED BY EBASCO.

2C) IN ADDITION TO YOUR "CADMIUM CAUSEWAY" SUGGESTION ABOVE, I ALSO FIND THIS ONE RATHER INCREDIBLE. IF I FOLLOW YOUR THINKING, YOU ARE SUGGESTING EXCAVATING THE TOP 120,000 CUBIC YARDS OF CONTAMINATED SOIL AND PILING IT UP SOMEWHERE, AND THEN DIGGING DOWN ANOTHER 20 FEET, 50 FEET, HOW FAR?, AND THEN MIXING IT ALL TOGETHER WHILE PUTTING IT BACK INTO FOUNDRY COVE. EVEN IF THERE WERE NO ENGINEERING CONSTRAINTS AT THE SITE, IE DEWATERING PROBLEMS MENTIONED ABOVE, NO NEARBY AREA TO STORE THE MOUNTAIN OF EXCAVATED SOIL, ETC., I DO NOT THINK SUCH A "DILUTION SOLUTION" IS A RESPONSIBLE WAY TO REMEDIATE THIS SERIOUS PROBLEM, AND I AM FAIRLY CONFIDENT THAT EPA WILL NOT ACCEPT SUCH A PLAN.

2D) I AM NOT SURE I FOLLOW THIS SUGGESTION AT ALL, BUT IF YOU MEAN THAT FOUNDRY COVE MARSH SHOULD SIMPLY BE COVERED OVER AND THE CONTAMINANTS BURIED, THAT NOT ONLY DOES NOT REMOVE THE PROBLEM BUT IT DESTROYS THE FOUNDRY COVE MARSH WHICH IS ECOLOGICALLY UNACCEPTABLE UNLESS A NEW MARSH IS CONSTRUCTED NEARBY.

2E) ARMOR IS UNACCEPTABLE BECAUSE IT DOES NOT LAST LONG ENOUGH. THE BEST PREDICTED LIFE IS 20 YEARS WHICH MEANS THAT SOONER OR LATER WE WOULD AGAIN BE FACED WITH A CADMIUM PROBLEM IN FOUNDRY COVE. AND IF YOUR EARLIER SUGGESTION OF EXCAVATION IS CARRIED OUT, WHAT DO WE NEED TO ARMOR?

2F) IF BY CARRY OUT RESTORATION YOU MEAN MARSH RESTORATION, COVERING THE MARSH WILL NOT ALLOW IT TO REGENERATE. ADDING EVEN A FEW INCHES IN ELEVATION TO THE FOUNDRY COVE MARSH WILL CAUSE THE SPECIES COMPOSITION OF THE PRESENT PLANT COMMUNITY TO CHANGE AND WILL ALLOW THE INVASION OF WOODY TREES AND SHRUBS AND OTHER SPECIES NOT NOW PRESENT OR DESIRED IN THE MARSH. EXCAVATION MUST BE FOLLOWED BY THE ADDITION OF SUFFICIENT CLEAN FILL TO RESTORE THE PRESENT MARSH CONTOURS AND ELEVATION IN ORDER FOR THERE TO BE ANY HOPE OF A SUCCESSFUL RESTORATION. EVEN THEN, RESTORATION TO A PRODUCTIVE TIDAL MARSH WILL BE A LONG PROCESS AND MAY NOT SUCCEED DUE TO INVASION OF PHRAGMITES, PURPLE LOOSESTRIFE AND OTHER PLANTS WHICH WERE NOT PRESENT IN THIS COUNTRY WHEN THE MARSHES FIRST ESTABLISHED THEMSELVES.

I BELIEVE THIS CONCLUDES MY COMMENTS ON YOUR LETTER TO JOEL SINGERMAN, AND I APOLOGIZE IF THEY SEEM TO BE

HARSH, BUT I DO NOT FEEL THAT REGION 3 OF NYSDEC HAS DONE ITS HOMEWORK ON THIS ONE. I FURTHER HOPE THAT YOU WILL BE ABLE TO SUPPORT THE NEARLY UNANIMOUS FEELING THAT CONSTITUTION MARSH ITSELF SHOULD BE SPARED ANY REMEDIATION ATTEMPT. NOT ONLY WOULD IT BE ENORMOUSLY EXPENSIVE, BUT IT WOULD HAVE THE POTENTIAL OF PERMANENTLY DEGRADING AN EXTREMELY IMPORTANT ECOSYSTEM IN RETURN FOR A MINOR POSITIVE IMPACT ON PUBLIC HEALTH.

NEW PALTZ IS NOT FAR AWAY AND I WOULD BE HAPPY TO PROVIDE A TOUR OF THE MARATHON BATTERY SITE TO YOU OR TO ANY OF YOUR STAFF WHO HAVE NOT VISITED IT. FINALLY, I WOULD VERY MUCH APPRECIATE RECEIVING COPIES OF ANY FURTHER COMMENTS YOU MAY BE PROVIDING TO EPA AND ASK THAT NATIONAL AUDUBON SOCIETY BE CONSULTED REGARDING ANY PROPOSALS WHICH MIGHT AFFECT CONSTITUTION MARSH.

THANK YOU FOR CONSIDERING THESE COMMENTS.

SINCERELY,

CC: JOEL SINGERMAN, USEPA
DEV SACHDEV, EBASCO
RON SLOAN, NYSDEC

JAMES P. ROD
MANAGER, CONSTITUTION MARSH SANCTUARY
NATIONAL AUDUBON SOCIETY.

RESPONSE TO
COMMENTS

LETTER FROM PAUL D. BARBER USACE

BASED ON THE ATTACHED MEMORANDUM FOR RECORD TO THIS LETTER FROM VARIOUS USACE PERSONNEL, THE FOLLOWING MAJOR AREAS OF CONCERN WERE NOTED IN A REVIEW OF THE ACRES RI/FS REPORT:

1. NO BENCH SCALE TREATABILITY STUDIES WERE PERFORMED;

2. BETTER DEFINITION OF THE AREA OF CONTAMINATION REQUIRED;

3. DISCUSSION OF POTENTIAL DISPOSAL SITES;

4. THE POTENTIAL FOR CONTAMINANT LEACHING AND MOBILIZATION DURING REMEDIAL ACTIVITIES;

5. EFFECTS OF VARIOUS TECHNOLOGIES SHOULD BE DISCUSSED;

6. 100 PPM CLEANUP CRITERIA TOO HIGH;

7. EFFECTS OF DREDGING ON CONSTITUTION MARSH HYDROLOGY, AND

8. EFFECT OF DREDGING OF EAST FOUNDRY COVE ON CONSTITUTION MARSH CONTAMINANT CONCENTRATION.

OUR ANSWERS AS THEY PERTAIN TO EBASCO'S RI/FS ARE:

CONCERN NUMBER 1. BENCH SCALE TREATABILITY STUDIES WERE PERFORMED IN SUPPLEMENTAL REMEDIAL INVESTIGATION. SEE SECTION 7.0 OF RI.

2. ADDITIONAL DATA WERE COLLECTED IN EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH TO DEFINE THE EXTENT OF CONTAMINATION. MORE DATA WILL BE COLLECTED CONCERNING THE FORMER BATTERY FACILITY AND HUDSON RIVER LOCATIONS.

3. IN THE SUPPLEMENTAL FS REPORT THE POTENTIAL DISPOSAL SITES (ON-SITE, AND OFF-SITE) WERE DISCUSSED IN SECTIONS 2.0, 3.0, 4.0 AND 5.0.

4. THE POTENTIAL FOR CONTAINMENT LEACHING AND MOBILIZATION DURING REMEDIAL ACTIVITIES WERE ADDRESSED BY BENCH SCALE TESTS (SECTION 7.0 OF RI) AND THE DETAILED DESCRIPTION AND EVALUATION OF THE REMEDIAL ALTERNATIVES (SECTION 4.0 AND 5.0 OF THE FS).

5. SEE SECTION 5.0 OF SUPPLEMENTAL FS REPORT THAT DISCUSSED ENVIRONMENTAL, PUBLIC HEALTH, TECHNICAL FEASIBILITY, INSTITUTIONAL REQUIREMENTS AND COSTS OF THE REMEDIAL ALTERNATIVES.

6. USEPA IN CONSULTATION WITH NYSDEC, NOAA AND USEPA ORD-OREGON DISCUSSED THE CLEANUP LEVEL TO BE IMPLEMENTED AT THE MARATHON BATTERY SITE. IT WAS THEIR CONCLUSION THAT 100 PPM CADMIUM IN THE SEDIMENT PROTECTS THE ENVIRONMENT.

7. BASED ON A JULY 7, 1986 MEETING WITH USEPA, NYSDEC AND NATIONAL AUDUBON SOCIETY IT WAS DETERMINED THAT THE NO ACTION ALTERNATIVE FOR CONSTITUTION MARSH WAS THE MOST EFFICIENT AND ECOLOGICALLY SOUND REMEDIAL ACTION. THE OTHER DREDGING OPERATIONS PROPOSED IN EBASCO'S SUPPLEMENTAL FS DISCUSSED THE EFFECTS OF DREDGING ON CONSTITUTION MARSH HYDROLOGY AND CONCLUDED THAT THEY WERE MINIMAL DUE TO THE PROPOSED RECONTOURING AND REVEGETATION OF THE MARSH AFTER DREDGING.

8. FOR THE PROPOSED REMEDIAL ALTERNATIVES FOR EAST FOUNDRY COVE AND EAST FOUNDRY COVE MARSH IN EBASCO'S FS REPORT, THE EFFECTS OF CONTAMINANT TRANSPORT TO CONSTITUTION MARSH DURING REMEDIAL ACTION WOULD BE MINIMAL BASED ON USE OF EARTH DIKES AND SILT CURTAINS DURING DREDGING (SEE SECTION 4.0 AND 5.0).

RESPONSES TO COMMENT LETTERS ON MARATHON BATTERY COMPANY
SITE - AREA I

SUPPLEMENTAL RI/FS REPORTS

LETTER FROM M. KAUTZ (NYSDEC) - AUGUST 1, 1986

PAGE 1 THE CURRENT LITERATURE ON TOXICOLOGICAL
PARAGRAPH 2 AND POPULATION EFFECTS LITERATURE PROVIDE INSUFFICIENT DOCUMENTATION TO DETERMINE WHAT DAMAGE MAY BE OCCURRING TO NATURAL RESOURCES IN EAST FOUNDRY COVE AND CONSTITUTION MARSH. THE INVESTIGATION OF THE EFFECTS OF MARATHON BATTERY CONTAMINANTS ON THE HUDSON RIVER WAS NOT PART OF THIS INVESTIGATION; THIS WILL BE DISCUSSED IN THE REMEDIAL INVESTIGATION OF AREA II. THE COMMENT OF NON-SUPPORT FOR THE THIRD REMEDIAL OBJECTIVE STATED IN THE RI REPORT WAS LATER CHANGED IN THE AUGUST 6, 1986 LETTER FROM RON SLOAN AND MARIE KAUTZ.

PAGE 1 THESE COMMENTS WERE ADDRESSED IN THE
PARAGRAPH 3 FINAL RI REPORT (SEE SECTION 8.1 IN THE RI REPORT).

PAGE 2 "TRANSPORT OF THE METAL CONTAMINANTS
PARAGRAPH 1 THROUGH THE FOOD CHAIN" MEANS THAT THE METALS ARE ACCUMULATED BY DIFFERENT TROPHIC LEVELS AND PASSED ON TO HIGHER TROPHIC LEVELS. THE OTHER COMMENTS IN THIS PARAGRAPH WERE ADDRESSED IN THE FINAL RI REPORT (SEE SECTION 8.3.2 OF THE RI REPORT).

PAGE 2 THESE WORDS WERE CHANGED IN THE FINAL
PARAGRAPH 2 RI REPORT (SEE SECTION 8.4 OF THE RI REPORT).

PAGE 2 THE DETECTION LIMITS USED FOR THIS
PARAGRAPH 3 INVESTIGATION ARE THOSE OF THE REM III CLP LABORATORIES. THE HIGH DETECTION LIMITS IN SOME INSTANCES WERE THE RESULT OF MATRIX EFFECTS ON THE SEDIMENT EXTRACT ANALYSIS.

LETTER FROM J. P. ROD, NATIONAL AUDUBON SOCIETY - AUGUST 5, 1986

COMMENTS ON DRAFT FS

PAGE 1-4 THE OWNER OF CONSTITUTION MARSH IS THE TACONIC STATE PARK COMMISSION. THIS CORRECTION HAS BEEN MADE.

PAGE 1-11 THE SCIENTIFIC NAME OF THE BLUE CLAW CRAB HAS BEEN CORRECTED IN THE FINAL FS REPORT (PAGE 1-10). THE HEALTH ADVISORY PERTAINING TO CRAB CONSUMPTION APPLIES TO THE HUDSON RIVER AS A WHOLE. THIS WARNING UPDATED A 1977 RECOMMENDATION BY THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) STATING THAT BLUE CRABS CAPTURED IN THE FOUNDRY COVE AREA SHOULD NOT BE CONSUMED.

PAGE 1-12 IT IS TRUE THAT ACRES INTERNATIONAL CORP FOUND BIOACCUMULATION OF CADMIUM IN FUNDULUS AND CRAYFISH. SEVERAL RESEARCHERS INCLUDING RON SLOAN AND RALPH KARCHER (NYSDEC) HAVE SUGGESTED THAT MORE RECENT UPLAND INPUTS MAY BE THE GREATEST SOURCE OF BIOLOGICALLY AVAILABLE CADMIUM TO AQUATIC ORGANISMS FREQUENTING THIS SITE. ALSO, SEVERAL STUDIES HAVE SHOWN THAT BENTHIC ORGANISMS THAT CONTACT HIGHLY CONTAMINATED SEDIMENTS ACCUMULATE THE HIGHEST CONCENTRATIONS OF THE CONTAMINANT METALS. THUS, PREVENTING BIOTA FROM CONTACTING THESE SEDIMENTS WOULD REDUCE AT LEAST ONE AVENUE OF CONTAMINANT TRANSPORT, THAT BEING FOOD CHAIN TRANSPORT.

PAGE 1-17 THERE WAS NO BIBLIOGRAPHY SECTION IN THE REPORT, AND THE TEXT ON PAGE 1-17 OF THE FINAL FS REPORT HAS BEEN CORRECTED TO REFLECT THIS. THE TYPOGRAPHICAL ERROR HAS BEEN CORRECTED AS COMMENTED (SEE PAGE REF.-2 OF THE FINAL RI REPORT).

PAGE 4-2 SECTION 4 SIMPLY PROVIDES DESCRIPTIONS OF THE REMEDIAL ALTERNATIVES. DETAILED EVALUATION OF THE FEASIBILITY OF THOSE ALTERNATIVES IS PROVIDED IN SECTION 5 AND EVALUATION RESULTS ARE SUMMARIZED IN SECTION 6. DISCUSSIONS SIMILAR TO THE COMMENTS CAN BE FOUND IN SECTIONS 5 AND 6.

PAGE 4-3 THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED BY EPA.

PAGE 4-6 THE HARVESTED CATTAILS AND OTHER AQUATIC PLANTS WOULD BE DISPOSED OF IN A PROPER LANDFILL (I.E., HAZARDOUS OR NON-HAZARDOUS), AS MENTIONED IN THE FINAL FS REPORT (PAGE 4-6). TO DATE, NO STANDARD TEST HAS BEEN SPECIFIED BY FEDERAL OR STATE REGULATORY AGENCIES TO DETERMINE WHETHER A METAL-CONTAMINATED PLANT IS HAZARDOUS OR NOT. THE DISPOSAL OF METAL-CONTAMINATED PLANTS WOULD BE EVALUATED ON A CASE-BY-CASE BASIS AND WOULD REFLECT THE LEVEL OF METAL IN PLANT TISSUE.

PAGE 4-8 THE MILL IN QUESTION IS AVAILABLE FROM THE VENDORS WHO HAVE DEVELOPED THE FIXATION PROCESS. IT IS NOT ANTICIPATED THAT ANY SPECIAL DESIGN OF THE MILL WOULD BE NECESSARY FOR THE EAST FOUNDRY COVE REMEDIAL ACTION. DURING THE ENGINEERING DESIGN STAGE, PILOT SCALE TESTS SHOULD BE CONDUCTED TO FURTHER CONFIRM THE FEASIBILITY OF THE PROCESS. THE LONG-TERM STABILITY OF THE CHEMICALLY FIXATED SEDIMENT WOULD ALSO BE TESTED BY USING THE EPA MULTIPLE EXTRACTION PROCEDURE. THIS PROCEDURE ALLOWS ONE TO ESTIMATE THE TOXICITY OF THE TESTED MATERIAL UNDER CONDITIONS SIMULATING 1,000 YEARS OF ACID RAIN. THE FEASIBILITY OF UTILIZING CHEMICALLY FIXATED WASTES (E.G., METAL-CONTAMINATED SLUDGE) AS MUNICIPAL LANDFILL COVERING MATERIAL HAS BEEN DEMONSTRATED BY ACTUAL APPLICATION IN THE USA.

PAGE 4-9 CONCERNS ABOUT THE QUALITY OF HAVERSTRAW BAY SEDIMENT WERE ADDRESSED IN THE FS REPORT (SEE PAGES 4-9 AND 4-10).

PAGE 4-10 IT IS TECHNICALLY FEASIBLE TO PLANT PICKERELWEED, ARROWHEAD AND BUR-REED IN MARSH RESTORATION. THE REASON FOR EXCLUDING THESE SPECIES FROM THE GENERIC PLAN PRESENTED IN THE FS IS THAT ULTIMATE FLORAL COMPOSITION OF THE RESTORED MARSH WILL DEPEND MOSTLY ON HABITAT SUITABILITY AND NOT PLANTING SPECIFICATIONS. IF BOTTOM CONTOURS ARE CREATED TO APPROXIMATELY PRE-DREDGING CONDITIONS, THESE SPECIES WILL COLONIZE THE RESTORED MARSH IN A MATTER OF SEVERAL YEARS. THE PURPOSE OF PLANTING CATTAIL AND ARROW-ARUM IS TO STABILIZE THE SUBSTRATE, DISCOURAGE COLONIZATION BY UNWANTED SPECIES, AND HASTEN DEVELOPMENT OF PRODUCTIVE MARSH HABITAT.

THE HEALTH HAZARDS ASSOCIATED WITH CONDUCTING FIELD STUDIES IN EAST FOUNDRY COVE MARSH, WHERE AVERAGE SEDIMENT CADMIUM CONCENTRATIONS APPROACH 28,000 MG/KG, OUTWEIGH THE BENEFITS OF A BOTANICAL INVENTORY. THESE BENEFITS ARE CONSIDERED MARGINAL IN LIGHT OF THE OVERRIDING IMPORTANCE OF PROPERLY RECONTOURING BOTTOM SUBSTRATE.

A DETAILED TOPOGRAPHIC SURVEY OF PRE-DREDGING SEDIMENT CONTOUR IS CRITICAL FOR DESIGNING AN APPROPRIATE MARSH RESTORATION PLAN. SUCH A SURVEY WILL BE PERFORMED AS PART OF THE DETAILED DESIGN PHASE.

MANUAL REMOVAL OF UNDESIRED INVADING PLANTS IS NOT CONSIDERED SUFFICIENTLY EFFECTIVE. ONE SPECIES OF PARTICULAR CONCERN, THE COMMON REED, PRODUCES EXTREME LATERAL RHIZOMES WHICH WOULD LIKELY REMAIN VIABLE IN THE SUBSTRATE IF INVADING PLANTS ARE PULLED OUT AND NOT HERBICIDE-TREATED. NEW SHOOTS OF REED WOULD SPROUT FROM RHIZOME SEGMENTS IN SUBSEQUENT YEARS.

THE MARSH RESTORATION PLAN SHOWN IN FIGURE 4-4 OF THE FINAL SUPPLEMENTAL FEASIBILITY STUDY REPORT IS ONLY GENERIC IN SCOPE; IT DEMONSTRATES THE FEASIBILITY OF MARSH RESTORATION. A DETAILED PLAN WILL BE DEVELOPED AS PART OF THE DETAILED DESIGN PHASE, IN WHICH ENVIRONMENTAL CONSEQUENCES OF HERBICIDE USAGE IN A WETLANDS ECOSYSTEM WILL BE CAREFULLY EVALUATED, AS WILL TECHNIQUES, TIMING AND EXTENT OF HARVESTING CATTAIL FROM CONSTITUTION MARSH FOR TRANSPLANTING TO THE RESTORED EAST FOUNDRY COVE MARSH. BOTH THESE CONSIDERATIONS WILL CERTAINLY REQUIRE COOPERATION AND TECHNICAL INPUT FROM THE NATIONAL AUDUBON SOCIETY.

USE OF A 1-FOOT BY 1-FOOT GRID INSTEAD OF A 2-FOOT BY 2-FOOT GRID WOULD PROVIDE GREATER PROTECTION AGAINST INVASION BY REEDS, AND MIGHT ALSO LESSEN PROBLEMS FROM ICE SCOURING. THESE ADVANTAGES WILL BE WEIGHED AGAINST COST AND AVAILABILITY OF CATTAIL SPRIGS, IN THE DETAILED PLAN TO BE DEVELOPED IN THE FUTURE.

TIDE CHANNELS WILL BE RESTORED AS PART OF THE EFFORT TO RECONTOUR MARSH SEDIMENTS TO PRE-CLEANUP CONDITIONS. SUBMERGENT AQUATIC PLANTS WILL PROBABLY INVADE ON THEIR OWN ACCORD, BUT PLANTING OR SEEDING OF DESIRED SPECIES WILL BE EVALUATED AS PART OF THE MARSH RESTORATION PLAN.

ICE SCOURING CAN BE A PROBLEM IN MARSH REESTABLISHMENT, ALTHOUGH THE SHELTERED POSITION OF EAST FOUNDRY COVE

SHOULD DECREASE THE ABRASIVE ACTION OF RAFTING RESULTING FROM RIVER CURRENTS. AN APPROPRIATE MITIGATIVE MEASURE IS PLANTING SPRIGS EARLY IN THE YEAR, IN THIS CASE DURING MARCH AND APRIL, TO MAXIMIZE THE PERIOD OF GROWTH AND ROOT PRODUCTION BEFORE ICE FORMATION. MORE EXTENSIVE ROOTMAT WILL ACT AS A BETTER ANCHOR AND DECREASE LOSS OF PLANTS AND SUBSTRATE ENCASED IN ICE.

AFTER REPLANTING, MARSH CONDITIONS WILL BE MONITORED ON AT LEAST AN ANNUAL BASIS. BARE PATCHES DUE TO PLANT MORTALITY, ICE SCOURING, ETC., WILL BE REPLANTED AS WILL AREAS WHERE EXTENSIVE WEED REMOVAL HAS BEEN REQUIRED.

PAGE 4-12 RESTORATION OF CATTAIL COVERAGE TO PRE-CLEANUP LEVELS WILL PROBABLY REQUIRE THREE TO FIVE YEARS. AS NOTED IN SECTION 5.3.1 OF THE FS, THE RESTORED MARSH WILL HAVE A MORE SHALLOW ROOT/SEDIMENT MAT AND MAY BE LESS PRODUCTIVE. THE EXTENT TO WHICH FLORAL COMPOSITION RETURNS TO PRE-CLEANUP CONDITIONS, AND TIME REQUIRED FOR SUCH RESTORATION ARE DIFFICULT TO PREDICT BECAUSE THEY DEPEND ON MANY FACTORS INCLUDING SUCCESS OF RECONTOURING, CHANGES IN HYDROLOGY RESULTING FROM DREDGING IN EAST FOUNDRY COVE, AND PLANT SPECIES INVASION RATES.

PROGRESS OF MARSH RESTORATION AND ENVIRONMENTAL CONDITIONS AT THE MARATHON BATTERY PLANT SITE, WILL BE MONITORED FOR 30 YEARS BY NYSDEC, AND FUNDED BY NYSDEC. THE SITE SPECIFIC MONITORING PROGRAM WILL BE DEVELOPED AS PART OF THE FINAL RESTORATION PROGRAM.

PAGE 4-13 THE FEASIBILITY OF ON-SITE DISPOSAL OF CHEMICALLY FIXATED SEDIMENT WAS ADDRESSED IN SECTIONS 5 AND 6 FROM AN ENGINEERING AND ENVIRONMENTAL PERSPECTIVE. ANY OTHER PUBLIC CONCERNS ABOUT THIS REMEDIAL TECHNOLOGY WILL ALSO BE CONSIDERED IN EPA'S FINAL SELECTION OF THE REMEDIAL ALTERNATIVE FOR CLEANING UP THE MARATHON BATTERY COMPANY SITE - AREA I.

BASED ON INFORMATION FROM MR. DAVE JACOBS OF METROPOLITAN TRANSPORTATION AUTHORITY ON JULY 11, 1986, FREIGHT TRAINS WOULD NOT BE ALLOWED TO USE RAILROAD.

THE SUGGESTED TRANSPORTATION ROUTE WILL BE CONSIDERED IN THE ENGINEERING DESIGN STAGE TO DETERMINE ITS FEASIBILITY. USING THE RAILROAD ACCESS ROAD TO HANDLE THE TRUCK TRAFFIC DURING CONSTRUCTION AND CLEANUP OPERATIONS WOULD BE EVALUATED AND CONSIDERATION WILL BE GIVEN TO CONSTRUCTION OF AN ACCESS ROAD BUILT ALONG THE NORTH EDGE OF THE EAST FOUNDRY COVE TO LINK THE RAILROAD ACCESS ROAD TO KEMBLE AVENUE.

PAGE 5-13 THE CONCERNS AND DRAWBACKS ASSOCIATED WITH CONTAINMENT WERE ADDRESSED IN FS SECTIONS 5 AND 6. AS REFLECTED IN THE RANKING OF REMEDIAL ALTERNATIVES, CONTAINMENT ALTERNATIVES RECEIVED THE NEXT TO LOWEST RANK (I.E., NEXT ONLY TO THE "NO ACTION" ALTERNATIVE).

PAGE 5-16 THE TECHNICAL AND ENVIRONMENTAL CONCERNS RELATED TO THE CONTAINMENT, NO ACTION, AND ON-SITE LANDFILL ALTERNATIVES WERE ADEQUATELY ADDRESSED IN SECTIONS 5 AND 6.

PAGE 5-18 "ALTERNATIVE CM-1: NO ACTION" WAS RANKED NO. 1 IN THE FS REPORT AMONG THE REMEDIAL ALTERNATIVES EVALUATED FOR CONSTITUTION MARSH.

WARNING SIGNS WERE MENTIONED IN THE DRAFT FS REPORT (SEE PAGE 4-23; SECTION 4.3.1).

PAGE 5-28 POTENTIAL IMPACTS TO GROUND WATER WERE DISCUSSED IN SECTION 5.3 OF THE FINAL FS REPORT. ALTHOUGH THE DISCUSSION WAS QUALITATIVE IN NATURE, IT IDENTIFIED THE ISSUES OF CONCERN. THE DEVELOPMENT OF FUTURE NEARBY WATER WELLS WAS NOT SPECIFICALLY DISCUSSED IN THE REPORT, BUT WAS MENTIONED IN THE DISCUSSION OF FUTURE GROUNDWATER IMPACTS. THE LIFE OF AN ON-SITE LANDFILL WAS ESTIMATED IN SECTION 5.2.1 UNDER ALTERNATIVE ECM-3 (SEE PAGE 5-10 OF THE FINAL FS REPORT). COMMENTS ON CONTAINMENT CAPS WERE DISCUSSED IN SECTIONS 5.2 AND 5.3 OF THE FS REPORT.

PAGE 5-38 THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED BY EPA.

PAGE 5-40 THANK YOU FOR YOUR AGREEMENT.

PAGE 5-87 THE O&M COST WAS PRESENTED ON AN ANNUAL BASIS. "(1-30 YR.)" MEANS THAT THE O&M COST WOULD BE

SPENT EVERY YEAR FOR A PERIOD OF 30 YEARS (I.E., FROM THE FIRST YEAR THROUGH THE THIRTIETH YEAR).

GENERAL COMMENT — THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED BY EPA.

SUMMARY OF COMMENTS — THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED BY EPA.

J.P. ROD'S AUGUST 5, 1986 COMMENTS

PAGE 4-3

OPERATION, MAINTENANCE, AND CONTINUING MONITORING ARE IMPORTANT COMPONENTS OF EVERY REMEDIAL ACTION. AS PART OF AN EPA/STATE AGREEMENT THAT WILL BE SIGNED FOR IMPLEMENTATION OF THE REMEDY, THE STATE OF NEW YORK WILL ACCEPT THE RESPONSIBILITY FOR OPERATION, MAINTENANCE, AND LONG-TERM MONITORING OF THE SITE.

MONITORING WELLS INSTALLED IN THE VICINITY OF THIS VAULT HAVE FAILED TO SHOW ANY HEAVY METALS CONTAMINATION. THE BURIAL VAULT WILL, HOWEVER, BE THE SUBJECT OF ADDITIONAL INVESTIGATION BY EPA.

PAGE 5-38

YOUR RECOMMENDATION APPEARS TO BE A GOOD IDEA AND WILL BE IMPLEMENTED.

GENERAL COMMENT

EPA AND NYSDEC HAVE SELECTED 100 MG/KG AS AN ACTION LEVEL FOR EAST FOUNDRY COVE MARSH BASED UPON THE AVAILABLE LITERATURE AND DISCUSSIONS WITH FEDERAL AND STATE FISH AND WILDLIFE EXPERTS. AN ACTION LEVEL FOR EAST FOUNDRY COVE WILL BE SELECTED UPON COMPLETION OF THE PLANNED BIOASSAY WORK.

SUMMARY OF COMMENTS

A PRESS RELEASE WAS ISSUED ON AUGUST 18, 1986, AND A PUBLIC MEETING WAS HELD ON AUGUST 26, 1986.

LETTER FROM M. KAUTZ, NYSDEC - AUGUST 6, 1986

PAGE 1 PARAGRAPH 1 — THIS COMMENT HAS BEEN CONSIDERED IN THE FINAL FS REPORT (SEE SECTION 6.0).

PAGE 1 PARAGRAPH 2 — PAGE 2-32 ONLY STATES THAT THE STABLE END PRODUCT DOES NOT LEACH METALS AND CAN NORMALLY BE CLASSIFIED AS A "NON-HAZARDOUS" WASTE IF IT PASSES THE EP TOXICITY TEST. IT DOES NOT IMPLY ANY OTHER MEANING BEYOND CLASSIFICATION OF THE FIXATED SEDIMENT UNDER THE EXISTING RCRA REGULATIONS AND CRITERIA. DURING THE DETAILED DESIGN STAGE MANY MORE TESTS SHOULD BE PERFORMED TO CONFIRM THESE RESULTS.

PAGE 1 PARAGRAPH 3 — THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED BY EPA.

PAGE 2 PARAGRAPH 1 — THE HEALTH ADVISORY PERTAINS TO BLUE CRAB CONSUMPTION THROUGHOUT THE HUDSON RIVER. THIS WARNING UPDATED A 1977 RECOMMENDATION BY THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) STATING THAT BLUE CRABS CAPTURED IN THE FOUNDRY COVE AREA SHOULD NOT BE CONSUMED.

PAGE 2 PARAGRAPH 2 — THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED BY EPA.

KAUTZ/SLOAN'S AUGUST 6, 1986 COMMENTS

PAGE 1, PARAGRAPH 3

RON SLOAN HAS SUBSEQUENTLY AGREED THAT 100 MG/KG IS AN ACCEPTABLE ACTION LEVEL FOR EAST FOUNDRY COVE MARSH. EAST FOUNDRY COVE WILL BE ADDRESSED AFTER COMPLETION OF THE BIOASSAY SAMPLING.

PAGE 2, PARAGRAPH 2

BIOASSAY SAMPLING WILL BE INCLUDED AS PART OF THE LONG-TERM MONITORING, AS YOU HAVE SUGGESTED.

J. P. ROD, NATIONAL AUDUBON SOCIETY LETTER TO R. PERGADIA, NYSDEC REGION 3 - SEPTEMBER 5, 1986

RESPONSE WE HAVE GENERAL AGREEMENT ON MOST OF THE TECHNICAL RESPONSES MR. J. P. ROD MADE TO MR. R. PERGADIA'S COMMENTS ON THE DRAFT FS REPORT.

LETTER FROM P. D. BARBER, USACE - AUGUST 20, 1986

PAGE 1 THIS COMMENT NEEDS FURTHER CLARIFICATION.
ITEM 1 A RESPONSE WILL BE PREPARED AFTER CLARIFICATION. MR. DONALD HOOKER OF USACE WAS CONTACTED ON SEPTEMBER 22, 1986.

PAGE 2 THE DUPLICATE SAMPLES WERE CO-LOCATED
ITEM 1 SAMPLES BASED ON USEPA GUIDANCE FOR MEASURING THE PRECISION OF THE SAMPLE COLLECTION METHODS. THE SEDIMENT SPLITS WERE PERFORMED IN THE LABORATORY AND THE RESULTS ARE REPORTED IN SECTION 5.5 OF THE FINAL RI REPORT.

PAGE 2 THE 5% DUPLICATE AND BLANK SAMPLES WERE THE
ITEM 2 QUANTITY REQUIRED BY USEPA REGION II ENVIRONMENTAL SCIENCES DIVISION.

PAGE 2 THE FIELD BLANKS ARE SAMPLES OF ANALYTE
ITEM 3 FREE DEIONIZED WATER PASSED THROUGH DECONTAMINATED SAMPLING EQUIPMENT AS DEFINED BY THE REM III FIELD TECHNICAL GUIDELINES BASED ON USEPA GUIDANCE.

PAGE 2 BACKGROUND SEDIMENT CONCENTRATIONS WERE
ITEM 4 PRESENTED IN SECTION 5.4 OF THE FINAL RI REPORT.

PAGE 2 A QA EXTERNAL STANDARD (PERFORMANCE SAMPLE)
ITEM 5 WAS PROVIDED TO THE ANALYTICAL LABORATORY BY USEPA. WE WERE NOT INFORMED OF THE RESULTS OTHER THAN CONFIRMATION THAT THE LABORATORY ANALYZED THE PERFORMANCE SAMPLE CORRECTLY.

PAGE 3 THE TERM "RCRA EP TOXICITY" WAS USED CORRECTLY
ITEM 6 IN THE REPORT. THE US ARMY CORPS OF ENGINEERS APPARENTLY CONFUSED THE ELUTRIATE TEST PROCEDURE WITH THE EP TOXICITY TEST PROCEDURE.

PAGE 3 THE RESULTS ARE BASED ON DRY WEIGHT
ITEM 7 SEDIMENT; THIS WAS NOT CLEARLY STATED IN THE REPORT.

PAGE 3 WE AGREE WITH THIS STATEMENT.
ITEM 8

LETTER FROM WILLIAM C. FARRELL - AUGUST 31, 1986

PAGE 2 PUBLIC HEALTH WAS DISCUSSED IN DETAIL
SECTION B.1 IN THE SUPPLEMENTAL RI, NOT IN THE FS. CADMIUM CONTAMINATION IN EAST FOUNDRY COVE AND CONSTITUTION MARSH DOES NOT EXCEED 0.3 MG/L FOR CLASS "B" WATERS; HOWEVER, THIS STANDARD IS BASED ON TOTAL METALS, NOT CONCENTRATIONS OF DISSOLVED METALS ALONE. IT IS UNFORTUNATE THAT MR. FARRELL DID NOT HAVE THE OPPORTUNITY TO REVIEW THE EBASCO RI REPORT. OTHERWISE THIS COMMENT AND OTHERS WHICH FOLLOW WOULD HAVE BEEN ADEQUATELY ANSWERED.

PAGE 3 HUMAN CONSUMPTION OF BIOTA - THE HEPATOPANCREAS IS NOT CONSIDERED THE "DEADMAN", IT IS IN FACT CONSIDERED A DELICACY AND EATEN BY MANY PEOPLE, AND IS THE ORGAN IN WHICH THE HIGHEST CONCENTRATION OF METALS ARE FOUND. AGAIN, THE RI REPORT DISCUSSES THE RISKS OF CONSUMPTION OF AREA AQUATIC BIOTA.

PAGE 3 FOOD CHAIN - METAL CONTAMINANTS IN SEDIMENTS AND DAMAGE TO BIOTA THE FS DOES NOT AND IS NOT THE PLACE TO DISCUSS FOOD CHAIN TRANSPORT. THIS TOPIC IS COVERED IN DETAIL IN THE RI REPORT.

PAGE 4 CONCLUSIONS THE DISSOLVED METAL CONCENTRATIONS ARE AT ACCEPTABLE LEVELS. IT IS THE TOTAL METALS THAT CONTRAVENE FEDERAL STANDARDS. WE AGREE THAT THERE ARE NO STANDARDS FOR SEDIMENT CONTAMINATION. WE AGREE THAT CADMIUM DOES NOT BIOMAGNIFY AND THAT THERE MAY BE NO DISCERNIBLE EFFECT ON THE BIOTA. HOWEVER, WE DISAGREE THAT THERE IS NO HEALTH THREAT FROM CONSUMPTION OF ANIMALS FROM EAST FOUNDRY COVE AND CONSTITUTION MARSH.

PAGE 4 PART A A PUBLIC HEALTH HAZARD FROM THE CONSUMPTION OF SOME AQUATIC ANIMALS IS OF CONCERN; SEE NYSDOH HEALTH ADVISORY ON BLUE CRABS.

PAGE 4 PART C THE FS REPORT DOES MENTION THAT THE AREA OF THE VILLAGE OF COLD SPRING PIER WILL BE STUDIED AFTER THIS INVESTIGATION IS COMPLETED.

PAGE 5 CONCLUSION IT IS NOT THE INTENT OF THE FS TO IGNORE THE EXISTING CONDITIONS ALONG CONSTITUTION DRIVE AND THE VILLAGE OF COLD SPRING PIER. THESE AREAS WERE NOT IN THE SCOPE OF THIS AREA I INVESTIGATION, BUT WILL BE STUDIED DURING THE AREA II INVESTIGATION. HOWEVER, RESIDENCES ALONG CONSTITUTION DRIVE ARE NOT IN THE SCOPE OF WORK FOR AREA II.

PAGE 5 PART D THIS POLICY QUESTION WILL BE ADDRESSED BY USEPA.

PAGE 6 PART E IT IS OUR BELIEF THAT THE REMEDIAL ACTION ON EAST FOUNDRY COVE MARSH, WITH SUBSEQUENT REVEGETATION, IS VIABLE. THERE ARE NUMEROUS CASES ALONG THE ATLANTIC COAST THAT SHOW REVEGETATION OF MARSH LAND IS POSSIBLE AND DOES WORK.

PAGE 6 PART F THESE ARE POLICY ISSUES AND WILL BE ADDRESSED BY USEPA.

PAGE 7 PART G IT SHOULD BE NOTED THAT THE 900 MG/KG CADMIUM LEVEL IS ONLY FOR HUMAN HEALTH PROTECTION AND DOES NOT CONSIDER EITHER POTENTIAL OR REAL ENVIRONMENTAL EFFECTS. HUMAN HEALTH IS NOT THE ONLY CRITERION FOR CLEANUP, ENVIRONMENTAL EFFECTS MUST ALSO BE CONSIDERED IN THE DETERMINATION OF AN APPROPRIATE REMEDIAL ACTION. THE REST OF THE COMMENTS EITHER RELATE TO THE DETAILED DESIGN PHASE OR POLICY ISSUES AND WILL BE ADDRESSED BY EPA.

FARRELL'S AUGUST 31, 1986 COMMENTS

PAGES 4 & 5

THE SUBJECT REPORT ONLY ADDRESSES FOUNDRY COVE AND CONSTITUTION MARSH. THE REMAINING PORTIONS OF THE SITE, AS WELL AS CONSTITUTION DRIVE, WILL BE COVERED IN THE REPORTS RESULTING FROM THE ONGOING INVESTIGATIONS.

PAGE 5

THE 100 MG/KG ACTION LEVEL WAS ESTABLISHED BY EPA AND NYSDEC TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT. THE 900 MG/KG LEVEL ONLY APPLIES TO THE PROTECTION OF PUBLIC HEALTH.

PAGE 6

DATA WAS GENERATED FROM TEST BORINGS EC-01 THROUGH EC-10. PLEASE SEE THE APPENDIX OF THE REMEDIAL INVESTIGATION REPORT.

PAGE 7

ADDRESSING EAST FOUNDRY COVE MARSH WILL REMOVE THE HOT SPOTS AS YOU SUGGEST. WE WILL, HOWEVER, BE USING A 100 MG/KG ACTION LEVEL.

REDUCING THE DEPTH OF DREDGING MAY NOT ALLOW THE REMOVAL OF SUFFICIENT CADMIUM-CONTAMINATED SEDIMENTS TO REACH THE NECESSARY REMEDIATION LEVEL.

THE OBJECTIVE OF REMEDIATING THE SITE IS NOT TO DESTROY FOUNDRY COVE, BUT TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT.

LETTER FROM R. SLOAN, NYSDEC - SEPTEMBER 2, 1986

PAGE 1 THERE IS STILL MUCH UNCERTAINTY AS TO
ITEM 1 THE BIOAVAILABILITY OF THE SEDIMENT-BOUND CADMIUM IN EAST FOUNDRY COVE AND CONSTITUTION MARSH. IT IS OBVIOUS FROM THE AVAILABLE DATA THAT BIOACCUMULATION IN CERTAIN AQUATIC SPECIES IS OCCURRING AT THE SITE. HOWEVER, IN YOUR PAPER (SLOAN AND KARCHER, 1985), IT WAS STATED "GIVEN THE STRONG CADMIUM BINDING CAPACITY OF SEDIMENT RESULTING IN A REDUCTION OF THE BIOLOGICALLY AVAILABLE METAL (HARDY ET AL., 1981; PHELPS, 1979) IT MAY WELL BE THAT ONGOING SOURCES OF CADMIUM ARE A MORE IMPORTANT CONSIDERATION IN THE ACCUMULATION OF HIGH HEPATOPANCREATIC LEVELS IN CRAB THAN ARE CONTAMINATED IN PLACE SEDIMENTS... ON THE OTHER HAND CADMIUM IN FOUNDRY COVE MAY BE TIGHTLY COMPLEXED AS CADMIUM CARBONATE (HAZEN AND KNEIP, 1980) AND MORE RECENT UPLAND INPUTS MAY BE THE GREATEST SOURCE OF BIOLOGICALLY AVAILABLE CADMIUM TO AQUATIC ORGANISMS FREQUENTING THIS SITE.". THEREFORE, THE INFERENCE THAT LEAVING BEHIND SEDIMENTS CONTAMINATED WITH 0 TO 100 MG/KG MAY STILL BE SUFFICIENT TO CONTINUE PRODUCING HIGH CONTAMINATION LEVELS IN THE BIOTA WOULD BE, IN A SENSE, MISLEADING BECAUSE WITH ALL THE OTHER POTENTIAL SOURCES OF CADMIUM TO THE HUDSON RIVER, THE CONTAMINATION OF AQUATIC BIOTA MAY CONTINUE TO BE THE RESULT OF OTHER INPUTS.

PAGE 1
ITEM 2 HOWEVER, THERE WILL BE A SUBSTANTIAL INCREASE IN THE AREA TO BE DREDGED IF DREDGING IS TO BE DONE TO 10 PPM LEVEL. TABLE 6-7 AND 6-8 OF THE FS REPORT GIVE THESE QUANTITIES AND COSTS.

PAGE 1 THE FIRST HALF OF THE COMMENT IS A
ITEM 3 POLICY ISSUE TO BE ANSWERED BY EPA. THE SUGGESTED CAPPING LAYER WOULD BE CONSIDERED IN THE DETAILED ENGINEERING DESIGN STAGE FOR MARSH RESTORATION. THE POTENTIAL IMPACT OF METAL-CONTAMINATED SEDIMENT IN EAST FOUNDRY COVE MARCH ON LOCAL GROUNDWATER WAS DISCUSSED IN THE FINAL FS REPORT ON PAGES 5-29 AND 5-30 UNDER ALTERNATIVE ECM-1: NO ACTION. FOR THOSE REMEDIAL ALTERNATIVES THAT INCLUDE REMOVAL OF METAL-CONTAMINATED SEDIMENT, THE RESIDUAL METALS SHOULD HAVE LESS IMPACT ON LOCAL GROUNDWATER.

PAGE 2 WHETHER OR NOT THE CADMIUM IS PRESENT EITHER
ITEM 4 AS THE HYDROXIDE OR CARBONATE FORM HAS NOT BEEN DETERMINED CONCLUSIVELY AT THIS POINT. HOWEVER, THE RESULTS OF THE BENCH SCALE TESTS CONDUCTED DURING THE RI ACTIVITIES SHOW THAT CADMIUM IN BOTH CONSTITUTION MARSH AND EAST FOUNDRY COVE MARSH SEDIMENTS IS RESISTANT TO ACID EXTRACTION AND MAY NOT BE READILY AVAILABLE TO THE BIOTA.

PAGE 2 WITH REFERENCE TO "BACKGROUND"
ITEM 5 CONCENTRATIONS OF CADMIUM LEVELS IN THE HUDSON RIVER, IS HIGHLY DEBATABLE. SHOULD BACKGROUND LEVELS BE MEASURED AT LOCATIONS THAT ARE PRISTINE OR IN AREAS OF SIMILAR INDUSTRIALIZATION OR AREAS OF HIGH WATER VELOCITIES WHERE SCOURING WOULD PROHIBIT DEPOSITION OF PARTICULATES (E.G., INDIAN BROOK). ALL OF THESE CONSIDERATIONS COULD BE SUPPORTED BY ONE PERSON OR ANOTHER. IT WAS OUR INTENT TO PROVIDE THE LEVEL OF CONTAMINATION FOUND IN AREAS NEAR THE FOUNDRY COVE AREA FROM THE AVAILABLE DATA.

PAGE 2 THE TEST ORGANISMS (MUMMICHOG AND CRAYFISH)

ITEM 6 DID NOT DIRECTLY CONTACT THE SEDIMENT; THEREFORE, THE RESULTANT ACCUMULATION WAS PROBABLY ONLY FROM THE WATER COLUMN OR FROM CONSUMPTION OF INDIGENOUS FOOD THAT FLOATED THROUGH THE WATER COLUMN. IN ADDITION, THERE WAS NO INDICATION IN THE ACRES RI WHETHER THE COMMERCIAL FOOD WAS ANALYZED FOR CADMIUM CONTENT; IF NOT, IT IS IMPOSSIBLE TO KNOW IF THE ORGANISMS INGESTED CADMIUM FROM THE COMMERCIAL FOOD.

PAGE 3 THE DEVELOPMENT OF THE 900 PPM HUMAN HEALTH
ITEM 7 SEDIMENT LEVEL IS ADEQUATE AND IS BASED UPON EPA METHODOLOGY FOR DETERMINING SAFE SEDIMENT CONTAMINANT LEVELS. ADDITIONAL BIOASSAYS WOULD NOT HELP IN BETTER EVALUATING HUMAN HEALTH CONSEQUENCES OF THE PRESENT SEDIMENT CONTAMINATION. THE PUBLIC HEALTH EVALUATION WAS BASED ON THE REAL PROBABILITY OF A PARTICULAR PATHWAY ACTUALLY OCCURRING AT THIS SITE.

PAGE 3 THESE COMMENTS ON INCREASED RELIANCE ON
ITEM 8 NATIVE FOODS ARE BASED ON INCOMPLETE EVIDENCE. ALTHOUGH THE TOTAL POPULATION AT RISK MAY RISE, THE TOTAL RISK FACTOR FROM CONSUMPTION OF CONTAMINATED BIOTA WILL NOT INCREASE.

PAGE 3
ITEM 9 THIS IS A POLICY ISSUE TO BE ANSWERED BY EPA.

SLOAN'S SEPTEMBER 2, 1986 COMMENTS

PAGE 1, ITEM 3

WE WILL BE ADDRESSING EAST FOUNDRY COVE MARSH AS YOU SUGGEST, AND WILL DEFER ACTION ON EAST FOUNDRY COVE UNTIL WE COMPLETE THE BIOASSAY WORK THAT YOU HAVE RECOMMENDED.

PAGE 3, ITEM 9

WE FEEL THAT WE HAVE ADDRESSED YOUR CONCERNS. THEREFORE, THERE SHOULD BE NO DELAYS ASSOCIATED WITH YOUR CONCERNS.

LETTER FROM A. BITTNER, PUTNAM CO. DEPT. OF HEALTH - SEPTEMBER 2, 1986

PAGE 1 AN IMMEDIATE REMOVAL RESPONSE TO CLEAR
ITEM 2 AREA I TO 900 MG/KG IS NOT WARRANTED BECAUSE THERE ARE NO SIGNIFICANT ACUTE HUMAN HEALTH OR ENVIRONMENTAL THREATS FROM THE SITE.

PAGE 1 THE PROPOSED DREDGING IS NOT GOING DOWN TO
ITEM 3 900 MG/KG. CLEANUP TO 100 MG/KG WAS ADDRESSED BY EPA.

PAGE 1 THIS IS A GOOD SUGGESTION. HOWEVER, IT MUST
ITEM 4 BE NOTED THAT THE PRESENT SIGNS ARE IGNORED.

LETTER FROM W. C. FARRELL - SEPTEMBER 3, 1986

PAGE 1 REGARDING THE 900 MG/KG SEDIMENT LEVEL, THIS
PARAGRAPH 4 LETTER FAILS TO CONSIDER THAT THIS LEVEL IS ONLY FOR HUMAN HEALTH PROTECTION AND DOES NOT CONSIDER POTENTIAL OR REAL ENVIRONMENTAL EFFECTS. HUMAN HEALTH IS NOT THE ONLY CRITERION FOR CLEANUP ACTIVITIES, ENVIRONMENTAL EFFECTS MUST ALSO BE CONSIDERED IN THE DETERMINATION OF A SAFE CLEANUP LEVEL. IT SHOULD BE NOTED THAT THE 900 MG/KG POSES NO HUMAN HEALTH RISKS IS EQUALLY APPLICABLE IN EAST FOUNDRY COVE MARSH, EAST FOUNDRY COVE AND CONSTITUTION MARSH.

LETTER FROM J. LEVINTON, SUNY-STONY BROOK - SEPTEMBER 9, 1986

PAGE 1 IT IS TRUE THAT THERE IS NO CONCLUSIVE EVIDENCE
PARAGRAPH 2 THAT THE BLUE CRAB CADMIUM CONTAMINATION PROBLEM IN THE HUDSON RIVER IS RELATED TO THE MARATHON BATTERY SITE. IN FACT, PREVIOUS STUDIES BY NYU HAVE SHOWN THAT TRANSPORT OF CADMIUM OUT OF EAST FOUNDRY COVE TO THE HUDSON RIVER CONTRIBUTES NEGLIGIBLE AMOUNTS OF CADMIUM TO THE RIVER. IN ADDITION TO THE

FOUNDRY COVE AREA CADMIUM CONTRIBUTION TO THE HUDSON RIVER, ONE MUST ALSO EXAMINE ALL OTHER POSSIBLE SOURCES OF CADMIUM. FOR EXAMPLE, IT HAS BEEN ESTIMATED THAT BETWEEN 130 TO 190 METRIC TONS OF CADMIUM PER DAY ARE DEPOSITED IN THE LOWER HUDSON RIVER SOUTH OF THE TAPAN ZEE BRIDGE FROM ALL SOURCES. THIS SUGGESTS THE ENORMITY OF CADMIUM INPUT INTO THE HUDSON RIVER FROM SOURCES OTHER THAN EAST FOUNDRY COVE.

THE DISADVANTAGES ASSOCIATED WITH CONTAINMENT ALTERNATIVES WERE DISCUSSED IN THE FS REPORT. AS FAR AS REMEDIAL OBJECTIVES ARE CONCERNED, THE CONTAINMENT ALTERNATIVES ARE WORKABLE ALTHOUGH THEY SEEM TO BE LESS FAVORABLE IN THIS CASE AS COMPARED WITH THOSE ALTERNATIVES INVOLVING REMOVAL, TREATMENT, AND DISPOSAL. THESE ALTERNATIVE REMEDIAL MEASURES ARE EVALUATED ON A CASE-BY-CASE BASIS.

PAGE 1 THE DERIVATION OF THE 900 MG/KG ACCEPTABLE
PARAGRAPH 4 HUMAN HEALTH RISK CADMIUM SEDIMENT CONCENTRATION IS BASED ON THE PRESENT SCIENTIFIC LITERATURE CONCERNING THE TRANSPORT OF CADMIUM IN SEDIMENTS INTO AQUATIC ANIMALS. THESE PARAMETERS ARE THEN USED IN CONJUNCTION WITH THE AVERAGE DAILY INTAKE OF CADMIUM FOR NORTHEAST U.S. POPULATIONS TO DERIVE AN ACCEPTABLE INTAKE OF CADMIUM NOT EXCEEDING THE USEPA ACCEPTABLE INTAKE OF 0.2 MG/DAY.

LETTER FROM T. R. REYNOLDS - SEPTEMBER 11, 1986

PAGE 1 THE DERIVATION OF 900 MG/KG CADMIUM AS AN
ITEM 1 ACCEPTABLE SEDIMENT CONCENTRATION WAS BASED ON THE PRESENT SCIENTIFIC LITERATURE REGARDING THE TRANSFER OF CADMIUM IN SEDIMENTS TO AQUATIC ORGANISMS. THESE PARAMETERS ARE THEN USED IN CONJUNCTION WITH THE AVERAGE DAILY INTAKE OF CADMIUM FROM ALL SOURCES FOR NORTHEAST U.S. POPULATIONS TO DERIVE AN ACCEPTABLE INTAKE OF CADMIUM THAT DOES NOT EXCEED THE CURRENT USEPA ACCEPTABLE DIETARY INTAKE OF CADMIUM OF 0.2 MG/DAY.

PAGE 1 THE DIFFERENCES IN VOLUME AND COST BETWEEN
ITEM 1 CLEANING UP EAST FOUNDRY COVE OPEN WATER SEDIMENTS TO 100 MG/KG AND TO 10 MG/KG (I.E., THE ENTIRE AREA) ARE PRESENTED IN TABLES 6-7 AND 6-8 OF THE FINAL FS REPORT.

PAGE 1 FIELD TESTS CONDUCTED FOR USEPA (SEE "HANDBOOK:
ITEM 2 REMEDIAL ACTION AT WASTE DISPOSAL SITES:, 1985) SHOWED THAT THE MUD CAT DREDGE IS VERY EFFICIENT IN REMOVING SEDIMENTS.

PAGE 2 IT IS GENERALLY FELT BY ALL THE AGENCIES
ITEM 3 INVOLVED IN REVIEW OF THIS RI/FS, INCLUDING THE NATIONAL AUDUBON SOCIETY, NYSDEC AND USEPA REGION II THAT "NO ACTION" IN CONSTITUTION MARSH IS FAVORED BECAUSE IT IS FEARED THAT ANY PERTURBATION OF ANY SECTION OF THE MARSH WILL SERIOUSLY AFFECT THE ECOLOGICAL HABITAT IT NOW PROVIDES. INCLUDED IN THE "NO ACTION" ALTERNATIVE FOR CONSTITUTION MARSH IS A 30-YEAR MONITORING PROGRAM THAT WILL MONITOR THE EFFECTS AND IF ANY PROBLEMS ARISE OVER THE 30 YEARS, A REEVALUATION OF THIS ALTERNATIVE WILL TAKE PLACE.

REMOVAL OF THE HOT SPOTS IN THE NORTHERN PORTION OF THE CONSTITUTION MARSH WAS CONSIDERED. THIS CONSIDERATION WAS DISCUSSED AMONG NATIONAL AUDUBON SOCIETY, NYSDEC, EBASCO AND USEPA IN THE JULY 7, 1986 MEETING HELD AT EPA'S REGION II OFFICE. SINCE THE REMOVAL OF THOSE HOT SPOTS WOULD DISTURB MORE THAN 25 ACRES OF THE MARSH, IT WAS CONCLUDED IN THE MEETING THAT ENVIRONMENTAL IMPACTS WOULD OUTWEIGH THE BENEFITS RESULTING FROM CLEANING UP THE HOT SPOTS.

LETTER FROM D. WEISS, NYSDOH - SEPTEMBER 12, 1986

PAGE 1 DURING THE ENGINEERING DESIGN STAGE,
ITEM 1 PILOT SCALE TESTS WOULD BE CONDUCTED TO FURTHER CONFIRM THE FEASIBILITY OF THE PROCESS. THE LONG-TERM STABILITY OF THE CHEMICALLY FIXATED SEDIMENT WOULD ALSO BE TESTED BY USING THE EPA MULTIPLE EXTRACTION PROCEDURE WHICH DETERMINES THE TOXICITY OF THE TESTED MATERIAL UNDER CONDITIONS SIMULATING 1,000 YEARS OF ACID RAIN.

PAGE 1 REMOVAL OF THE HOT SPOTS IN THE NORTHERN
ITEM 2 PORTION OF THE CONSTITUTION MARSH WAS CONSIDERED. THIS CONSIDERATION WAS DISCUSSED AMONG NATIONAL AUDUBON SOCIETY, NYSDEC, EBASCO AND EPA IN THE JULY 7, 1986 MEETING HELD AT EPA'S REGION II

OFFICE. SINCE THE REMOVAL OF THOSE HOT SPOTS WOULD DISTURB MORE THAN 25 ACRES OF THE MARSH, IT WAS CONCLUDED IN THE MEETING THAT ENVIRONMENTAL IMPACTS WOULD OUTWEIGH THE BENEFITS RESULTING FROM CLEANING UP THE HOT SPOTS.

PAGE 2 IT SEEMS APPROPRIATE THAT THE
ITEM 3 WORD "PRINCIPAL" SHOULD HAVE BEEN USEDINSTEAD OF "ONLY".

PAGE 2 THE ASPECTS ARE IMPLICIT IN THE REMEDIAL
ITEM 4 RESPONSE OBJECTIVES.

ADDITIONAL COMMENTS FROM DON HOOKER - USACE
SEPTEMBER 15, 1986

PAGE 1 ADDITIONAL INFORMATION FROM USACE IS NEEDED TO DETERMINE
ITEM 1 THE APPLICABILITY OF THE "ROTATING CYLINDER EROSION TEST" TO THE SEDIMENTS AT THE MARATHON BATTERY COMPANY SITE. MR. DONALD HOOKER OF USACE HAS BEEN CONTACTED, AND HE WILL SEND EBASCO THE REQUIRED INFORMATION ABOUT THE TEST. UP TO DATE, (9/30/86), THIS INFORMATION HAS NOT YET BEEN RECEIVED BY EBASCO. AS INFORMED, THIS TEST WAS ORIGINALLY DEVELOPED BY UNIVERSITY OF CALIFORNIA AT DAVIS FOR USACE'S TRUMAN RESERVOIR PROJECT IN CALIFORNIA.

PAGE 2 WE AGREE WITH THIS STATEMENT.
ITEM 1

PAGE 2 THE FIELD BLANKS ARE SAMPLES OF ANALYTE FREE DEIONIZED
ITEM 2 WATER PASSED THROUGH DECONTAMINATED SAMPLING EQUIPMENT AS DEFINED BY THE REM III FIELD TECHNICAL GUIDELINES BASED ON USEPA GUIDANCE.

PAGE 2 THE TERM "RCRA EP TOXICITY" WAS USED CORRECTLY IN THE
ITEM 3 REPORT. THE USACE APPARENTLY CONFUSED THE ELUTRIATE TEST PROCEDURE WITH THE EP TOXICITY TEST PROCEDURE.

PAGE 2 THE RESULTS ARE BASED ON DRY WEIGHT SEDIMENT; THIS WAS
ITEM 4 NOT CLEARLY STATED IN THE REPORT.

PAGE 2 WE AGREE WITH THIS STATEMENT.
ITEM 5

PAGE 2 THE DUPLICATE SAMPLES WERE CO-LOCATED SAMPLES BASED ON
ITEM 6 USEPA GUIDANCE FOR MEASURING THE PRECISION OF THE SAMPLE
PART A COLLECTION METHODS. THE SEDIMENT SPLITS WERE PERFORMED IN THE LABORATORY AND THE RESULTS ARE REPORTED ON SECTION 5.5 OF THE FINAL RI REPORT.

PAGE 2 THE 5% DUPLICATE AND BLANK SAMPLES WERE THE QUANTITY
ITEM 6 REQUIRED BY USEPA REGION II ENVIRONMENTAL SCIENCES
PART B DIVISION.

PAGE 3 BACKGROUND SEDIMENT CONCENTRATIONS WERE PRESENTED IN
ITEM 6 SECTION 5.4 OF THE FINAL RI REPORT.
PART C

PAGE 3 A QA EXTERNAL STANDARD (PERFORMANCE SAMPLE) WAS PROVIDED
ITEM 6 TO THE ANALYTICAL LABORATORY BY USEPA. WE WERE NOT
PART D INFORMED OF THE RESULTS OTHER THAN CONFIRMATION THAT THE LABORATORY ANALYZED THE PERFORMANCE SAMPLE CORRECTLY.

LETTER FROM W. B. SCHMIDT, BUREAU OF MINES (U S DEPARTMENT OF INTERIOR) - SEPTEMBER 18, 1986

GENERAL RESPONSE WE THANK BUREAU OF MINES (BOM) FOR LETTING US SHARE THEIR EXPERIENCES AND TECHNOLOGIES WHICH COULD BE APPLICABLE TO THE CLEANUP OF MARATHON BATTERY COMPANY AS WELL AS TO THE CLEANUP OF OTHER SUPERFUND SITES. IT IS OBVIOUS THAT THE CONCEPTS MENTIONED IN BOM'S LETTER NEED FURTHER RESEARCH AND IMPROVEMENT PRIOR TO THEIR PRACTICAL APPLICATION AT THE MARATHON BATTERY COMPANY SITE. WE APPRECIATE BOM'S CANDOR ABOUT THEIR PROPOSED TREATMENT OPTIONS, AS REFLECTED IN PARAGRAPH ONE, PAGE FOUR OF BOH'S LETTER, QUOTED BELOW:

"AS I NOTED AT THE START OF THE LETTER, OUR INTEREST WAS MORE IN THE ASSESSMENT METHODOLOGY AS IT RELATES TO TREATMENT OPTIONS (FOR REASONS TIED TO OUR PROGRAMMATIC INTERESTS) RATHER THAN IN A DETAILED CRITIQUE OF YOUR CONTRACTOR'S EFFORTS. WHILE IT APPEARS CLEAR TO US THAT THERE ARE TECHNICALLY-FEASIBLE TREATMENT OPTIONS (OTHER THAN FIXATION), WE HAVE NO DESIRE TO HAVE THIS CONCLUSION INTERFERE WITH WHAT RECOGNIZE AS EPA'S INTEREST IN MOVING EXPEDITIOUSLY TO CLEAN UP THE MARATHON SITE. THE FACT THAT THERE ARE OTHER OPTIONS IN NO WAY INDICATES THAT THESE OPTIONS ARE "BETTER" FOR EPA THAN THE ONES OUTLINED BY THE CONTRACTOR. WE DID SOME VERY PRELIMINARY ORDER-OF-MAGNITUDE COST ASSESSMENTS OF METALLURGICAL-TYPE TREATMENT AND THOSE ANALYSES SUGGEST THAT, FOR THIS MATERIAL, UNDER THE CONDITIONS DESCRIBED, OUR SORT OF TREATMENT WOULD BE MORE COSTLY THAN FIXATION.".

WITH RESPECT TO THE PROPOSED TREATMENT OPTIONS IN BOM'S LETTER, WE COMMENT AS FOLLOWS:

ITEM 1 "BIOHARVESTING" TO REMOVE CONTAMINANT
PAGE 1 METALS FROM SEDIMENTS AT THE MARATHON BATTERY COMPANY SITE WAS CONSIDERED IN THE ACRES' DRAFT FS REPORT (1985, PAGE A-9). THIS TREATMENT OPTION WAS ELIMINATED BECAUSE OF ITS UNKNOWN FEASIBILITY (E.G., EFFECTIVENESS OF PLANT UPTAKE, COMPATIBILITY OF PLANTS WITH THE SITE ENVIRONMENT, ETC.) AND LONG TIME FRAME FOR REDUCTION OF CONTAMINANT LEVELS (POSSIBLY ONE HUNDRED YEARS OR MORE). IN ADDITION, PLANT HARVESTING WOULD INCREASE THE RESUSPENSION AND MIGRATION OF METAL-CONTAMINATED SEDIMENTS OFF-SITE.

THE CONCEPT OF CONSTRUCTING BARRIERS TO ENCLOSE THE AREA WITH METAL-CONTAMINATED SEDIMENTS COULD DAMAGE THE EXISTING MARSH LANDS BECAUSE THE BARRIER WOULD BLOCK TIDAL FLOW TO THE ENCLOSED MARSH. THE APPROACH OF CONSTRUCTING BARRIER WETLANDS WOULD NOT BE APPROPRIATE FOR EAST FOUNDRY COVE AND MARSH AREAS BECAUSE IT WOULD NOT REDUCE THE EXERCISE CONCENTRATIONS OF CADMIUM OCCURRING THEN. FOR THE CONSTITUTION MARSH AFFECTED AREA, HOWEVER, WHERE CADMIUM CONCENTRATIONS ARE GENERALLY MUCH LOWER, USE OF EXISTING CATTACT WETLANDS AS A NATURAL BARRIER TO FURTHER MIGRATION OF CONTAMINATED SEDIMENTS IS CONSIDERED APPROPRIATE. THE EFFECTIVENESS OF ENHANCING METAL UPTAKE THROUGH FERTILIZATION IS QUESTIONABLE IN THAT THE TIDAL WATER EXCHANGE IN AREA I IS ESTIMATED TO BE 32 MILLION GALLONS PER TIDAL CYCLE. POTENTIAL WATER POLLUTION IN THE HUDSON RIVER FROM THIS FERTILIZATION IS OF CONCERN.

PAGE 3 BOTH THE EBASCO SUPPLEMENTAL FS (1986) AND
ITEM 2 ACRES DRAFT FS (1985) CONSIDERED THERMAL TREATMENT (INCINERATION) AS A COMPONENT TREATMENT PROCESS FOR AN OVERALL REMEDIAL ALTERNATIVE FOR METAL REMOVAL. AS STATED IN THE SUPPLEMENTAL FS REPORT (PAGE 2-32), INCINERATION WOULD EVAPORATE WATER FROM THE SEDIMENT SLURRY AND DECOMPOSE ANY ORGANIC MATTER. THEREFORE, IT COULD BE USED FOR SEDIMENT DRYING, VOLUME REDUCTION, AND TRANSFORMATION OF SEDIMENTS INTO A FORM MORE AMENABLE FOR METAL LEACHING AND SUBSEQUENT RECOVERY. THE MAIN REASON FOR ELIMINATING THIS TECHNOLOGY FROM FURTHER CONSIDERATION WAS COST. THE BENEFIT WHICH THIS TECHNOLOGY CAN BRING TO AN OVERALL TREATMENT SYSTEM CANNOT OFFSET THE COST. AIR POLLUTION EFFECTS WERE ALSO OF CONCERN. HOWEVER, WE AGREE THAT MITIGATING MEASURES OR A RECOVERY SYSTEM CAN REDUCE/ELIMINATE AIR POLLUTION. AIR POLLUTION WAS ONE OF THE MAIN REASONS WHICH ELIMINATED INCINERATION OF METAL-CONTAMINATED SEDIMENTS AT AN EXISTING OFF-SITE FACILITY.

PAGE 3 WE ARE VERY INTERESTED IN THE RESULTS OF
ITEM 3 BOM'S TRIALS OF EXTRACTING METALS FROM SEDIMENT WITH VARIOUS CHEMICAL SOLUTIONS. IF A PROCESS CAN EFFICIENTLY EXTRACT METALS AT REASONABLE COST, WE WOULD CONSIDER IT IN THE SUPPLEMENTAL RI/FS FOR AREA II. IT SHOULD BE MENTIONED THAT EFFICIENCY MUST BE JUDGED NOT ONLY BY PERCENTAGE RECOVERY, BUT ALSO BY THE LEVEL OF RESIDUAL METALS IN THE SEDIMENT (OR ASH) WHICH WOULD AFFECT THE FINAL DISPOSAL OF SEDIMENT (OR ASH). AS MENTIONED ABOVE THERMAL TREATMENT OF METAL-CONTAMINATED SEDIMENTS IS A VERY COSTLY TREATMENT PROCESS.

PAGE 3 THE BIOLOGICAL TECHNIQUES YOU CONSIDERED
ITEM 4 (I.E., APPLICABLE TO INORGANIC MATERIALS) WERE ASSESSED IN THE ACRES DRAFT FS REPORT

(1985; PAGES A-5, A-6, A-25, B-27, B-28, AND 6-5) FOR REMOVAL AND RECOVERY OF METALS IN THE SEDIMENTS AT THE SITE. THIS TECHNOLOGY WAS ELIMINATED FROM FURTHER CONSIDERATION DUE TO HIGH COST AND LOW RELIABILITY. THEREFORE, THIS TECHNOLOGY WAS NOT CONSIDERED IN THE SUPPLEMENTAL FS REPORT.

PAGE 4
PARAGRAPH 2
EBASCO WOULD APPRECIATE THE OPPORTUNITY TO PARTICIPATE IN A MEETING AS SUGGESTED IN BOM'S LETTER.

LETTER FROM P. P. HAMILTON, U.S. FISH AND WILDLIFE - AUGUST 7, 1986

PAGE 1 THESE CONCERNS WERE ADDRESSED IN
PARAGRAPH 3 SECTION 6.2.2 OF THE FINAL RI REPORT EXCEPT THAT BECAUSE WE ARE DEALING WITH A STUDY IN NEW YORK STATE, NEW JERSEY'S CONCERN OVER THE ATLANTIC TOMCOD WAS NOT INCLUDED AS PER USEPA REQUEST.

PAGE 1 WE AGREE WITH THIS COMMENT.
PARAGRAPH 4

PAGE 2 THE LISTING OF THE AMERICAN BLACK DUCK
PARAGRAPH 1 AS A SPECIES OF SPECIAL CONCERN WAS INCLUDED IN THE FINAL RI REPORT.

PAGE 2 THIS CONCERN WAS INCLUDED IN SECTION
PARAGRAPH 2 6.2.2 OF THE FINAL RI REPORT.

PAGE 2 THE SNAPPING TURTLE WAS ANALYZED FOR
PARAGRAPH 3 CONTAMINANT METALS BY ACRES INTERNATIONAL. THEY FOUND ONLY THE LIVER, KIDNEY, HEART AND GONADS HAD ELEVATED CADMIUM LEVELS WHILE MUSCLE TISSUE DID NOT. THE ADULT SNAPPING TURTLE HAS NO PREDATORS EXCEPT MAN AND SINCE ONLY MUSCLE TISSUE IS EATEN, IT WILL NOT CONTRIBUTE A SIGNIFICANT HEAVY METAL BURDEN TO OTHER TROPHIC LEVELS INCLUDING MAN. NO AMPHIBIANS WERE EVER TRAPPED OR ANALYZED FROM THIS SITE.

PAGE 2 THE HUDSON RIVER WAS NOT PART OF THE
PARAGRAPH 4 AREA I STUDY AREA. IT WILL BE ADDRESSED IN THE AREA II REPORT.

PAGE 2 THE HUDSON RIVER WAS NOT PART OF THE
PARAGRAPH 5 AREA I STUDY AREA. IT WILL BE ADDRESSED IN THE AREA II REPORT.

PAGE 2 THIS INFERENCE IS CORRECT. THE AVAILABLE
PARAGRAPH 6 TOXICOLOGICAL DATA INDICATE THAT AQUATIC ORGANISMS ARE ABLE TO STORE LARGE AMOUNTS OF ESSENTIAL AND NON-ESSENTIAL ELEMENTS BY SEQUESTERING THEM IN METALLOTHIONEINS. THESE PROTEINS ARE CAPABLE OF BINDING LARGE QUANTITIES OF ESSENTIAL AND NON-ESSENTIAL METALS. ORGANISMS IN MUCH CLEANER ENVIRONMENTS THAN THE FOUNDRY COVE AREA MAY STILL STORE EXCESS ESSENTIAL METALS IN THE NON-TOXIC MATRICES SO THE ENERGY REQUIRED TO SEQUESTOR THE NON-ESSENTIAL METALS; SEE O'CONNOR, J.M. AND J.W. RACHLIN (1982). PERSPECTIVES ON METALS IN NEW YORK BIGHT ORGANISMS: FACTORS CONTROLLING ACCUMULATION AND BODY BURDENS. IN: ECOLOGICAL STRESS AND THE NEW YORK BIGHT: SCIENCE AND MANAGEMENT. G.F. MAYER (ED.) ESTUARINE RESEARCH FEDERATION, COLUMBIA, SOUTH CAROLINA PP. 655-673.

PAGE 2 THANKS FOR YOUR AGREEMENT.
PARAGRAPH 7

PAGE 2 THE EVALUATION OF THE REMEDIAL ALTERNATIVES
PARAGRAPH 8 WAS REVISED AS REFLECTED IN THE FINAL FS REPORT (SEE SECTIONS 5 AND 6). THE CONCERNS OF ON-SITE DISPOSAL HAVE BEEN DISCUSSED IN THE FS REPORT AND WILL BE CONSIDERED DURING EPA'S SELECTION OF THE REMEDIAL ALTERNATIVES FOR CLEANING UP THE EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE.

PAGE 3 THIS IS A POLICY-RELATED COMMENT TO BE ANSWERED
PARAGRAPH 1 BY EPA.

HAMILTON'S AUGUST 7, 1986 COMMENTS

PAGE 3, PARAGRAPH 1.

AT THIS TIME, WE BELIEVE THAT THERE IS NO SCIENTIFIC EVIDENCE SUPPORTING AN ACTION LEVEL OF 10 MG/KG. BASED UPON DISCUSSIONS WITH RON SLOAN OF NYSDEC, 100 MG/KG WILL BE USED AS AN ACTION LEVEL FOR EAST FOUNDRY COVE MARSH. ACTION WILL BE DEFERRED ON EAST FOUNDRY COVE UNTIL PLANNED BIOASSAY SAMPLING IS COMPLETED.

LETTER FROM R. PERGADIA, NYSDEC REGION 3 - AUGUST 18, 1986

PAGE 1 AN IMMEDIATE REMOVAL (IR) RESPONSE
PARAGRAPH 1 REQUIRES A SIGNIFICANT AND ACUTE THREAT
PART 1 TO HUMAN HEALTH OR THE ENVIRONMENT FROM THE SITE. NO SUCH CONDITION PRESENTLY EXISTS AT THIS SITE. NOT ENOUGH DATA ARE AVAILABLE TO WARRANT AN IR AT THE FORMER BATTERY FACILITY.

PAGE 1 REMEDIATION OF CONSTITUTION MARSH IS
PARAGRAPH 1 NOT WARRANTED BECAUSE THERE IS NO
PART 2 SIGNIFICANT ADVERSE HUMAN HEALTH IMPACT FROM THE SITE AND REMEDIATION OF THIS SIGNIFICANT FRESHWATER MARSHLAND WOULD CAUSE GREATER ENVIRONMENTAL PROBLEMS THAN IT WOULD SOLVE.

PAGE 1 THE HUDSON RIVER WAS NOT PART
PARAGRAPH 1 OF THIS STUDY (AREA I), HOWEVER, IT IS PART OF
PART 3 STUDY AREA II. IT IS UNNECESSARY TO DEFER FUTURE STUDIES OF WEST FOUNDRY COVE AND THE HUDSON RIVER PIER AREAS BECAUSE THE CONTAMINANTS FROM EAST FOUNDRY COVE ARE NOT ADDING SIGNIFICANTLY TO THE HUDSON RIVER CONTAMINATION.

PAGE 2 THE 900 MG/KG SEDIMENT LEVEL WAS
PARAGRAPH 2 ESTABLISHED ONLY FOR HUMAN HEALTH PROTECTION. IT DOES NOT TAKE INTO ACCOUNT ENVIRONMENTAL RISKS. EACH OF THESE RISKS MUST BE WEIGHED SEPARATELY AND USED TO ADDRESS THE FINAL CLEAN UP LEVEL.

PAGE 2 AS DEFINED IN SECTION 1.0 ON PAGE 1-1
PARAGRAPH 3 OF THE DRAFT FS REPORT, THE FORMER BATTERY PLANT SITE IS A PART OF AREA II. WHETHER OR NOT EXCAVATION IS THE REMEDIAL ACTION FOR THE PLANT SITE WILL BE DETERMINED IN THE SUPPLEMENTAL RI/FS FOR AREA II. DREDGING THE HOT SPOTS IN CONSTITUTION MARSH WOULD DISTURB MORE THAN 25 ACRES OF THE MARSH. ENVIRONMENTALLY, THIS COULD CAUSE MORE HARM THAN GOOD TO THE MARSH ECOSYSTEM. DETAILED DISCUSSION CAN BE FOUND IN SECTIONS 5 AND 6 OF THE FS REPORT CONCERNING ALTERNATIVE CM-1: NO ACTION. OTHER THAN THE FORMER BATTERY PLANT SITE, THE REMAINING "ON-SITE AREA" OF THE AREA I IS IN THE 100 YEAR FLOOD PLAIN. DISPOSAL OF HAZARDOUS WASTES IN A 100 YEAR FLOOD PLAIN IS GENERALLY NOT PERMITTED BY REGULATIONS. THEREFORE, USING EXCAVATED SEDIMENT TO BUILD PIER, ACCESS ROAD, PARKING LOT, CAUSEWAY, ETC. ON-SITE WOULD NOT BE FEASIBLE.

PAGE 2 THE ISSUE OF RESTORING THE CONSTITUTION
PARAGRAPH 4 MARSH OVER A LONG PERIOD WAS CONSIDERED IN THE DRAFT FS REPORT. IF DREDGING IS CONSIDERED AS THE REMEDIAL ACTION FOR THE CONSTITUTION MARSH, IT WOULD BE CARRIED OUT IN A STAGED MANNER. EACH DREDGED AREA OF THE MARSH WOULD TAKE 5 YEARS TO RESTORE.

PAGE 2 THE SUGGESTED IN-SITU ACID LEACH/BASE
PARAGRAPH 5 RECOVERY AND ULTRAFILTRATION SYSTEM WAS CONSIDERED INFEASIBLE FOR THE FOLLOWING REASONS:

1) THE BENCH SCALE ACID LEACHING TEST RESULTS (SEE SECTION 7 OF THE RI REPORT) SHOW THAT LESS THAN 27 PERCENT OF THE METALS WAS LEACHED OUT OF THE CONTAMINATED SEDIMENT AFTER VIGOROUSLY MIXING WITH ACID AT PH OF ABOUT 2.0 FOR ONE HOUR. ALTHOUGH THE TEST WAS NOT A LONG-TERM SIMULATION, THE RESULTS WERE CONSIDERED SUFFICIENTLY ADEQUATE TO INDICATE THAT ACID LEACHING IS NOT AN EFFECTIVE CHEMICAL PROCESS TO REMOVE METALS FROM CONTAMINATED SEDIMENTS IN AREA I.

2) IT IS QUESTIONABLE THAT THE METALS IN THE SEDIMENT CAN BE EFFECTIVELY LEACHED OUT BY SIMPLY ADDING ACID TO THE WATER COLUMN TO MAINTAIN PH AT A SLIGHTLY ACIDIC LEVEL. WITHOUT MIXING SEDIMENT WITH ACIDIC SOLUTION, THE CHANCE OF DIRECT CONTACT FOR CHEMICAL REACTION WOULD BE FAR LESS. THIS SLOW PROCESS, IF FEASIBLE, COULD MAKE THE TIME REQUIRED FOR CLEANUP TOO LONG TO BE ACCEPTABLE.

3) IT WOULD BE VERY DIFFICULT TO ADEQUATELY MIX ACID WITH AMBIENT WATER TO MAINTAIN A SLIGHTLY ACIDIC PH AT ALL TIMES IN A LARGE WATERBODY WITH TIDAL WATER EXCHANGE OF 32 MILLION GALLONS PER TIDAL CYCLE. IT WOULD NOT BE COST-EFFECTIVE BECAUSE OF THE VOLUME OF TIDAL WATER THAT WOULD REQUIRE TREATMENT FOR BASE RECOVERY AND ULTRAFILTRATION.

4) CHANGING EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH TO AN IMPOUNDMENT DURING ACID TREATMENT COULD CAUSE DAMAGE TO THE MARSH LANDS.

PAGE 3 THE SUGGESTED IMMEDIATE REMOVAL IS CONSIDERED
PARAGRAPH 1 UNJUSTIFIABLE FOR THE REASONS GIVEN EARLIER.

PAGE 3 IT IS UNDERSTOOD THAT DILUTION IS NO SOLUTION
PARAGRAPH 2 TO POLLUTION.

PAGE 3 IF THE CONTAMINATED AREA WERE SIMPLY COVERED
PARAGRAPH 3 BY SOIL, THE TOPOGRAPHY WOULD BE ALTERED SO MUCH THAT THE MARSH LANDS WOULD NOT CONTINUE TO EXIST.

PAGE 3 USING ARMOR AS A REMEDIAL TECHNOLOGY WAS
PARAGRAPH 4 CONSIDERED IN THE DRAFT FS REPORT.

PAGE 3 IF A RELATIVELY LARGER MARSH LAND WOULD BE
PARAGRAPH 5 DREDGED AND RESTORED, THESE REMEDIAL ACTIONS WOULD BE CARRIED OUT IN A STAGED MANNER APPROPRIATE FOR MAINTAINING THE MARSH ECOSYSTEM.

RESPONSES TO COMMENT LETTERS ON MARATHON BATTERY COMPANY SITE - AREA I

SUPPLEMENTAL RI/FS REPORTS

LETTER FROM J. CIVINS AND M. C. VEYSEY, VINSON & ELKINS SEPTEMBER 22, 1986

PAGE 1 THE REASONING BEHIND PROPOSING REMEDIATION
PARAGRAPH 1 IN EAST FOUNDRY COVE MARSH AND NOT IN CONSTITUTION MARSH FOLLOWS: CONSTITUTION MARSH CONTAINS 270 ACRES OF CATTAIL MARSH VS. 14 ACRES FOR EAST FOUNDRY COVE MARSH; CONSTITUTION MARSH IS LISTED BY NYSDEL AS A SIGNIFICANT COASTAL FISH AND WILDLIFE HABITAT BUT EAST FOUNDRY COVE IS NOT; THE LEVEL OF CONTAMINATION IS LOWER IN CONSTITUTION MARSH THAN IN EAST FOUNDRY COVE MARSH. DISCUSSIONS WITH NYSDEC AND NATIONAL AUDUBON CONCLUDED THAT CONSTITUTION MARSH SHOULD NOT BE REMEDIATED, BUT THE CONTINUING SOURCE OF CONTAMINATION, EAST FOUNDRY COVE, SHOULD BE REMEDIATED. NYSDEC AND US FISH & WILDLIFE ARE CONCERNED ABOUT THE EFFECTS ON CONSTITUTION MARSH AND THE HUDSON RIVER, IF CONTAMINATION IN EAST FOUNDRY COVE AND EAST FOUNDRY COVE MARSH IS ALLOWED TO CONTINUE TO SPREAD INTO CONSTITUTION MARSH AND THE HUDSON RIVER.

CONSTITUTION MARSH HARBORS EXTENSIVE NESTING HABITAT FOR A SPECIES OF SPECIAL CONCERN; AND IS ACTIVELY MANAGED BY THE NATIONAL AUDUBON SOCIETY. FURTHERMORE, THE EXTENT OF CONSTITUTION MARSH RENDERS IT UNUSUAL TO THE HUDSON RIVER ESTUARY. EAST FOUNDRY COVE MARSH COMPRISES LESS THAN 14 ACRES; PROVIDES MUCH LESS (IF ANY) HABITAT FOR SPECIES OF SPECIAL CONCERN; AND IS NOT PART OF THE AUDUBON MANAGEMENT AREA.

ASSOCIATED WITH CONSIDERATION OF NEGATIVE IMPACTS IS THE GREATER DIFFICULTY OF RESTORING DISTURBED MARSH IN A 100 ACRE AREA, AS WOULD BE REQUIRED IF CONSTITUTION MARSH WERE DREDGED. RESTORATION OF A 12-14 ACRE MARSH TO REPLACE THE ONE DREDGED IN EAST FOUNDRY COVE, HOWEVER, IS CONSIDERED VERY FEASIBLE. WHEN WORKING WITH 12-14 ACRES, INVASION OF A PLANTED CATTAIL ARROW ARUM MARSH BY UNDESIRABLE PLANTS SUCH AS RED OR PURPLE LOOSESTRIFE CAN BE PREVENTED OR CORRECTED BY MEANS OF HAND-PULLING AND/OR HERBICIDAL TREATMENT. THE AREA ADJACENT TO THE RESTORED EAST FOUNDRY COVE MARSH, THAT IS EAST FOUNDRY COVE AND THE UPLAND, IS NOT PARTICULARLY SENSITIVE TO POSSIBLY ADVERSE EFFECTS ATTENDING MARSH RESTORATION, SUCH AS USE OF HERBICIDES AND INCREASED TURBIDITY RESULTING FROM RECONTOURING SEDIMENTS.

IN CONSTITUTION MARSH, ON THE OTHER HAND, IT WOULD BE VERY DIFFICULT TO PREVENT SUCH ACTIVITIES FROM ADVERSELY AFFECTING THE REMAINING UNDISTURBED AND SENSITIVE CATTAIL-ARROW ARUM MARSH.

PAGE 1 THE ADVERSE EFFECTS OF THE PREFERRED
PARAGRAPH 2 ALTERNATIVE WERE NOT DISCOUNTED; IT UNDERSTOOD THAT MARSH REVEGETATION MAY TAKE YEARS TO ACCOMPLISH. THE POSSIBLE FAILURE OF THE RE-VEGETATION EFFORT MUST ALSO BE WEIGHED AGAINST THE POTENTIAL EFFECTS OF LEAVING HIGHLY CONTAMINATED SEDIMENTS IN PLACE WHICH MAY CONTRIBUTE TO FUTURE ECOLOGICAL EFFECTS.

ENVIRONMENTAL CONCERNS ASSOCIATED WITH EACH OF THE INVESTIGATED REMEDIAL ALTERNATIVES WERE ADDRESSED IN THE SUPPLEMENTAL FS REPORT, SECTION 5.3. THE SAME EVALUATION CRITERIA WERE APPLIED TO BOTH EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH. HOWEVER, DUE TO THE DEGREE OF CONTAMINATION AND SIZE OF THESE TWO MARSHES, DIFFERENT REMEDIAL ACTIONS WERE RECOMMENDED. EAST FOUNDRY COVE MARSH IS SMALL (14 ACRES) AND HIGHLY CONTAMINATED BY METALS (I.E., MEAN CD CONCENTRATION APPROACHES 28,000 MG/KG). DREDGING OPERATIONS WILL TEMPORARILY DISTURB THIS MARSH. HOWEVER, PRESENT TECHNOLOGY HAS DEMONSTRATED IN MANY PLACES IN THE USA THAT A MARSH THE SIZE OF EAST FOUNDRY COVE MARSH CAN BE RESTORED. THEREFORE, CLEANUP OF METAL-CONTAMINATED SEDIMENTS IN EAST FOUNDRY COVE MARSH IS JUSTIFIED FOR THE PROTECTION OF HUMAN HEALTH AND ENVIRONMENT.

CONSTITUTION MARSH IS LARGE (270 ACRES) AND FAR LESS CONTAMINATED (I.E., THE MEAN CADMIUM CONCENTRATION APPROACHES 180 MG/KG). DREDGING OPERATIONS TO REMOVE THE 100 ACRES OF MARSH WITH CADMIUM CONCENTRATION GREATER THAN 100 MG/KG WILL CAUSE DAMAGE AND LOSS OF ENTIRE MARSH. SINCE THE ENVIRONMENTAL IMPACTS RESULTING FROM CLEANUP OUTWEIGH THE BENEFITS, "NO ACTION" WAS THEREFORE CONSIDERED AS THE REMEDIAL ACTION FOR THE CONSTITUTION MARSH. IT SHOULD BE NOTED THAT EAST FOUNDRY COVE MARSH AND CONSTITUTION MARSH REPRESENT 4.9% AND 95.1% OF THE TOTAL MARSH IN AREA I, RESPECTIVELY. THE RISK OF ENVIRONMENTAL HARM WAS CONSIDERED IN THE DETAILED EVALUATION OF REMEDIAL ALTERNATIVES.

CONSIDERATION OF THE RISK AND CONSEQUENCES OF FAILURE OF THIS REVEGETATION TECHNOLOGY PLUS THE RELATIVELY FEWER BENEFITS TO BE GAINED FROM CLEANUP OF CONSTITUTION MARSH, THE DREDGING ALTERNATIVES (I.E., CM-2 AND CM-3) WERE RANKED LOWER THAN ALTERNATIVE CM-1: NO ACTION (SEE SECTION 5.3 AND 6.0 OF THE SUPPLEMENTAL FS).

PAGE 2 TO 4 THERE IS OF COURSE, NO GUARANTEE THAT A CATTAIL MARSH CAN BE RE-ESTABLISHED IN EAST FOUNDRY COVE WITH ONLY ONE ATTEMPT. FOR THIS REASON, SUCCESS OF THE INITIAL EFFORT WILL BE CAREFULLY MONITORED, TO ASSURE THAT UNWANTED SPECIES DO NOT INVADE. AREAS WHERE REESTABLISHMENT OF CATTAIL OR ARROW ARUM ARE NOT SUCCESSFUL WOULD BE REPLANTED OR RECONTOURED, AS NECESSARY. IN THIS MANNER, IT IS REASONABLE TO ASSURE THAT RESTORATION WILL, IN TIME, BE SUCCESSFUL. AS NOTED IN SECTIONS 4.0 AND 5.0 OF THE FS, THE RESTORED MARSH (AS CONCEPTUALLY CONCEIVED) WILL LIKELY SUPPORT (INITIALLY) LOWER DENSITIES OF PLANTS AND WILL CONTAIN LESS UNDERLYING MUCK SOIL. THE LATTER FACTOR WILL ALTER SOME OF THE ECOLOGICAL FUNCTION OF THE MARSH IN THAT BOTTOM HABITAT FOR BENTHIC ORGANISMS WILL BE DIFFERENT. IT MERITS NOTING, HOWEVER, THAT EVEN THIS IMPACT IS NOT INEVITABLE; ORGANIC SEDIMENT MAY BE USED AS PART OF THE CLEAN FILL, WHICH WILL BE EVALUATED IN THE DETAILED MARSH RESTORATION PLAN.

PAGE 5 TO 9 THE PURPOSE OF THE PUBLIC HEALTH ASSESSMENT WAS TO DETERMINE IF AN ACTUAL OR POTENTIAL PUBLIC HEALTH THREAT EXISTS, DUE TO SITE CONTAMINATION. THE METHODOLOGY USED FOLLOWED EPA GUIDANCE IN REMEDIAL INVESTIGATIONS UNDER CERCLA BY (1) GENERATING THE MOST PROBABLE CASE, USING CONSERVATIVE QUANTIFICATION OF MAXIMUM AND AVERAGE EXPOSURE AT ALL IDENTIFIED HUMAN EXPOSURE POINTS OF POTENTIAL SIGNIFICANCE AND (2) CALCULATING THE REDUCTION IN POPULATION EXPOSURES ACHIEVABLE BY VARIOUS REMEDIAL TECHNOLOGIES. ALTHOUGH THE QUANTITATIVE APPROACH IS MORE DETAILED THAN THE QUALITATIVE, IT IS STILL PRIMARILY DESIGNED TO GENERATE ESTIMATES.

WE HAVE INDICATED THAT REMEDIAL ACTION IS WARRANTED BASED SOLELY ON THE FINDINGS OF KNEIP AND O'CONNOR (1979) AND THE NYS HEALTH ADVISORY FOR CONSUMING HUDSON RIVER CRABS. THE PATHWAY MODELING ANALYSIS PERFORMED FOR THE RI WAS USED ONLY TO DEFINE REMEDIAL OBJECTIVES AND HEALTH BASED SEDIMENT CLEANUP LEVELS.

THE ERT COMMENTS SUGGEST THAT THE KNEIP AND O'CONNOR SCENARIO MAY NOT BE REASONABLE FOR THE FOLLOWING REASONS:

1. CADMIUM CONCENTRATIONS USED IN THEIR RISK ASSESSMENT (1976 CRAB DATA) ARE HIGHER THAN ANY OTHERS SUBSEQUENTLY REPORTED, AND

2. TOXICITY LIMITS USED IN THE ASSESSMENT WERE FOR CHRONIC EXPOSURES AND THESE TYPES OF EXPOSURES CAN'T BE SUSTAINED BECAUSE OF THE HIGHLY FLUCTUATING CRAB POPULATION IN THE AREA.

WHILE IT IS TRUE THAT KNEIP'S AND O'CONNOR'S ASSESSMENT MAXIMIZES POTENTIAL IMPACT BY UTILIZING THE 1976 CRAB CONCENTRATIONS, THE MEAN AND STANDARD DEVIATION OF THESE MEASUREMENTS FOR ALL SOFT TISSUE (5.19 +/- 3.66 MG/KG) AGREE VERY WELL WITH THE SOFT TISSUE CONCENTRATIONS OF THE EIGHT CRABS IMPLANTED AT FOUNDRY COVE STATION B DURING 1978 (4.17 +/- 3.78 MG/KG; KNEIP AND O'CONNOR, 1979). CONSIDERING THIS FACT AND THE FACT THAT CADMIUM BODY BURDENS IN FOUNDRY COVE CRABS ARE HIGHLY VARIABLE, DUE IN PART TO THEIR MOBILE EXISTENCE (MIGRATE IN AND OUT OF AREA), UTILIZING MAXIMUM VALUES IS PRUDENT AND FOLLOWS CERCLA GUIDELINES.

KNEIP AND O'CONNOR ALSO ASSESSED THE ACUTE IMPACT OF EATING FOUNDRY COVE CRABS PREPARED BY COOKING METHODS SPECIFIC TO THE PEOPLE OF COLD SPRING. THEY STATE:

"A POTENTIALLY SERIOUS HEALTH HAZARD TO SOME PORTION OF THE CRAB-EATING POPULATION IS REAL, BUT SUBJECT TO WIDE VARIATIONS IN THE ESTIMATE OF THE DEGREE OF THE RISK. BETTER DATA ON CADMIUM IN CRABS IS BADLY NEEDED. THE APPLICATION OF THE AVAILABLE RESULTS TO ALL PEOPLE TAKING CRABS FROM THE HUDSON RIVER OR NEARBY WATERS IS SUBJECT TO SERIOUS QUESTIONS BECAUSE OF THE DATA ON CD IN CRABS FROM AREAS OTHER THAN FOUNDRY COVE. THE ELEVATED VALUES IN CRABS FROM THE HAVERSTRAW AREA INDICATES A POTENTIALLY WIDESPREAD PROBLEM. THE APPARENT SAFETY FACTOR BETWEEN CRITICAL EXPOSURES AND OVER-EXPOSURE ESTIMATES IS UNACCEPTABLY SMALL.

USING THE EXTRAPOLATED DATA FROM JUVENILE AND ADULT CRABS AND THE CONSUMPTION PATTERNS OF THE COLD SPRING RESIDENTS, IT IS ESTIMATED THAT 12-1/2 TO 50 YEARS OF CRAB CONSUMPTION COULD LEAD TO CRITICAL KIDNEY CADMIUM BURDENS IN EXPOSED HUMANS. THESE ESTIMATES MAKE NO ALLOWANCE FOR ERRORS IN FDA DIET CALCULATIONS, HAVE NOT INVOLVED STUDIES OF LOCAL DIET CADMIUM CONTENTS, AND DO NOT INCLUDE ANY FACTORS ACCOUNTING FOR CADMIUM INTAKE BY SMOKERS.".

THE ERT COMMENTS ALSO WRONGLY STATED THAT THE CONSULTANT'S PATHWAY ANALYSIS CONCLUDED THAT A SIGNIFICANT HEALTH RISK EXISTS FOR FISH AND CRAB INGESTION FROM FOUNDRY COVE. AS PREVIOUSLY MENTIONED THE PATHWAY ANALYSIS WAS USED ONLY TO DEVELOP CADMIUM SEDIMENT LEVELS WHICH ARE PROBABLY SAFE TO HUMANS. THE ANALYSIS SHOWED THAT, BASED UPON THE MOST CRITICAL EXPOSURE MODEL (FISH INGESTION), THE HUMAN HEALTH PROTECTIVE SEDIMENT CONCENTRATION IS SOME LEVEL ABOVE 937 MG/KG AND THAT CHOOSING THE LOWEST CONCENTRATION IN THIS RANGE (937 ROUNDED TO 900 MG/KG) ASSURES THAT HUMAN HEALTH IS PROTECTED (PG. 8-37).

IN A RAPID REVIEW OF THE RI/FS PERFORMED BY DR. T. J. KNEIP HE CONCLUDED THAT THE POSSIBLE HEALTH IMPACTS DISCUSSED BY O'CONNOR AND HIMSELF ARE OVER INTERPRETATIONS BECAUSE OF THE EXTREME ASSUMPTIONS USED IN THEIR ANALYSIS. WE FEEL, HOWEVER, THAT THE ASSUMPTIONS USED IN HIS OWN ANALYSIS ARE NOT AS EXTREME AS HE SUGGESTS. IT MUST BE REMEMBERED THAT THE CRAB CATCH, CONSUMPTION AND COOKING METHODS AND INDIVIDUAL SMOKING HABITS USED IN HIS ASSESSMENT ARE REAL AND SPECIFIC FOR THE PEOPLE CRABBING IN FOUNDRY COVE. KNOWING THAT PEOPLE DO INDEED EAT FOUNDRY COVE CRABS IN A MANNER WHICH COULD ACUTELY OR CHRONICALLY ADVERSELY AFFECT THEIR HEALTH ONLY SERVES TO UNDERSCORE THE NEED FOR REMEDIAL ACTION AT THIS SITE.

PAGE 7 THE RI MODEL RELIES ON SITE SPECIFIC MEASURED
LAST PARAGRAPH DATA FROM THE SITE. DR. J. M. O'CONNOR WAS CONSULTED REGARDING CRAB INGESTION RATES.

PAGE 8 EDIBLE FLESH SHOULD HAVE INCLUDED THE
MID-PAGE HEPATOPANCREAS SINCE THESE TISSUE CONCENTRATIONS WERE NOT PART OF ERT'S MODEL EQUATIONS. THEY ARE INVALID ESTIMATES OF THE MAXIMUM AND AVERAGE EXPOSURES REQUIRED BY EPA GUIDANCE UNDER CERCLA.

PAGE 9 SITE SPECIFIC LABORATORY STUDIES AND
BULLETS BIOMONITORING FOR CADMIUM IN INDIVIDUALS WHO CONSUME BIOTA FROM FOUNDRY COVE WOULD BE FROUGHT WITH EPIDEMIOLOGICAL PROBLEMS IN DETERMINING WHERE HUMAN CADMIUM INTAKE OCCURRED, BECAUSE THE AVERAGE CD INTAKE IS 13 MG/DAY FOR U.S. POPULATIONS.

PAGE 9 AND 10 ALTHOUGH PREVIOUS RESEARCH HAS SHOWN NO GROSS VISUAL SIGNS OF STRESS, RESEARCH NOW BEING CONDUCTED BY J. ROD (NATIONAL AUDUBON SOCIETY) ON MUSKRAT REPRODUCTIVE SUCCESS IN CONSTITUTION MARSH AND EAST FOUNDRY COVE MARSH INDICATES THAT MUSKRAT REPRODUCTIVE SUCCESS AND THE NUMBER LIVING IN THE MARSHES IS DEPRESSED. THE INFORMATION GATHERED TO DATE IS NOT FULLY ANALYZED AND WILL NOT BE COMPLETE UNTIL EARLY NEXT YEAR. JIM ROD BELIEVES THAT CADMIUM LEVELS IN THE AREA MUSKRATS IS AFFECTING THEIR REPRODUCTIVE SUCCESS (J. ROD, PERS. COMM.).

PAGE 11 THRU 14 THE DECISION ON THE 100 MG/KG CLEAN UP CRITERION WAS REACHED BETWEEN NYSDEC, NOAA, USEPA REGION II AND USEPA ORD IN OREGON.

PAGE 13 TOP OF PAGE SITE SPECIFIC DATA BY KNEIP ET AL. 1979 AND ACRES 1985 SHOWS UPTAKE OF CADMIUM IN AQUATIC ANIMALS IN THE FOUNDRY COVE AREA, WITH BENTHIC ORGANISMS HAVING THE HIGHEST CONCENTRATIONS OF THE CONTAMINANT METALS.

PAGE 15 PARAGRAPH 1 THE ENGINEERING AND ENVIRONMENTAL CONSIDERATIONS ASSOCIATED WITH HYDRAULIC DREDGING OPERATIONS WERE EVALUATED, BASED ON A SERIES OF BENCH SCALE TESTS USING SITE-SPECIFIC SEDIMENTS, (SEE THE SUPPLEMENTAL RI REPORT, SECTION 7). THOSE BENCH SCALE TESTS INCLUDED AN ELUTRIATE TEST, A SETTLING TEST AND A FILTERABILITY TEST. CONTROL MEASURES WERE CONSIDERED FOR ALL REMEDIAL ALTERNATIVES INVOLVING DREDGING TO PREVENT SEDIMENT TRANSPORT OFF-SITE (SEE THE SUPPLEMENTAL FS REPORT, SECTION 4).

CAREFUL CONSIDERATION HAS BEEN GIVEN TO THE RISKS INCURRED IN TRANSPORTING SEDIMENTS OFF-SITE; TRANSPORTATION-RELATED INQUIRIES ARE ADDRESSED IN SECTION 5 OF THE FS.

PAGE 15 PARAGRAPH 2 IF CONTAMINATED SEDIMENT IS TREATED BY DEWATERING, IT WOULD THEN BE TRANSPORTED TO A PERMITTED RCRA DISPOSAL SITE FOR FURTHER TREATMENT AND DISPOSAL. THEREFORE, THE TEST IN QUESTION IS NOT APPLICABLE TO DEWATERED SEDIMENT.

PAGE 15 PARAGRAPH 3 THE SUPPLEMENTAL RI/FS REPORTS DID NOT RECOMMEND ANY REMEDIAL ACTION FOR AREA I. THE REPORTS SIMPLY PRESENT THE FEASIBLE REMEDIAL ALTERNATIVES BASED ON DETAILED EVALUATION WITH RESPECT TO TECHNICAL FEASIBILITY, ENVIRONMENTAL IMPACTS, PUBLIC HEALTH REQUIREMENTS, INSTITUTIONAL REQUIREMENTS AND COSTS. THESE REPORTS WERE RELEASED FOR REVIEW BY THE PUBLIC. EPA WILL MAKE THE FINAL SELECTION OF THE REMEDIAL ACTION FOR AREA I AFTER REVIEWING ALL COMMENTS.

PAGE 15 PARAGRAPH 4 THE BENCH SCALE TEST RESULTS INDICATE THAT SEDIMENTS CAN BE CHEMICALLY FIXATED (SEE THE SUPPLEMENTAL RI REPORT, SECTION 7). THESE RESULTS WERE ADEQUATE FOR EVALUATING THE TREATMENT PROCESS IN THE RI/FS. DURING THE ENGINEERING DESIGN STAGE, PILOT SCALE TESTS WILL BE CONDUCTED TO FURTHER CONFIRM THE FIXATION PROCESS.

PAGE 16 PARAGRAPH 1 THE ON-SITE LANDFILL OPTION WAS ADEQUATELY EVALUATED (SEE SUPPLEMENTAL FS REPORT, SECTIONS 5 AND 6). LAND AVAILABILITY AND CAPACITY, IMPACTS ON A POTENTIALLY VALUABLE AQUIFER, AND PUBLIC CONCERNS WERE CONSIDERED DURING THE EVALUATION. BECAUSE OF THESE CONSIDERATIONS, THE CONSERVATIVE APPROACH OF USING A RCRA LANDFILL WAS IDENTIFIED IN THE SUPPLEMENTAL FS.

PAGE 16 PARAGRAPH 2 THIS ISSUE WILL BE EVALUATED IN THE AREA II RI/FS.

PAGE 17 PARAGRAPH 1 THE 100 MG/KG CLEANUP LEVEL WAS DETERMINED AMONG NYSDEC, AND EPA DURING ACRES FS CONDUCTED FOR THE MARATHON BATTERY COMPANY SITE. FOR EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE, "NO ACTION" ALTERNATIVES WERE CONSIDERED UNACCEPTABLE FOR THE REASONS OF PROTECTING THE PUBLIC HEALTH AND ENVIRONMENT. THE DREDGING OPERATIONS SPECIFIED IN THE SUPPLEMENTAL FS REPORT WOULD NOT CAUSE ANY SIGNIFICANT OR LONG-TERM IMPACTS TO THE ENVIRONMENT. FOR DETAILS OF THE ABOVE DISCUSSIONS, SECTIONS 4, 5 AND 6 OF THE SUPPLEMENT FS REPORT SHOULD BE CONSULTED.

PAGE 17 PARAGRAPH 2 "COMPLETE REMOVAL" AND "PARTIAL REMOVAL" WERE TERMS USED IN THEIR RELATIVE SENSE IN THE SUPPLEMENTAL FS REPORT. THE MAJOR CONCERN, AS COMMENTED, IS OBVIOUSLY QUESTIONING WHETHER THE "HOT SPOT" SHOULD BE DEFINED BY 100 MG/KG OR SOME OTHER HIGHER LEVELS. THE DETERMINATION OF USING 100 MG/KG AS THE LEVEL FOR PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT WAS GIVEN IN THE PREVIOUS RESPONSE. THE POTENTIAL AND TEMPORARY DISTURBANCE RELATED TO DREDGING THE METAL-CONTAMINATED SEDIMENTS IN EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE AND THE CONTROL AND MITIGATING MEASURES TO REDUCE/ELIMINATE THE ASSOCIATED ENVIRONMENTAL IMPACTS WERE FULLY ADDRESSED IN THE SUPPLEMENTARY FS REPORT SECTIONS 4 AND 5. NO SIGNIFICANT LONG-TERM ENVIRONMENTAL IMPACTS WILL BE RESULTED

FROM THE DREDGING OPERATIONS IN QUESTION.

PAGE 18 ERT'S CONSULTANT, DR. T. KNEIP (NYU), HAS DETERMINED THAT PARTIAL DREDGING IS UNACCEPTABLE BECAUSE, "THE REMOVAL OF THE SEDIMENTS IN ONLY A PORTION OF THE COVE WOULD RESULT IN THE EVENTUAL REESTABLISHMENT OF THE SAME CADMIUM CONCENTRATION CONTOURS BY RESUSPENSION; RAINFALL EROSION AND TIDAL TRANSFER AS PREVIOUSLY OCCURRED AFTER THE EARLIER DREDGING.".

PAGE 18 THIS PARAGRAPH ADDRESSED THE SAME ISSUE
PARAGRAPH 1 AS PARAGRAPH 2 ON PAGE 17. THE RESPONSE TO THAT PARAGRAPH IS APPLICABLE TO THIS PARAGRAPH. IN ADDITION, IT SHOULD BE MENTIONED THAT THE ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE METAL-CONTAMINATED SEDIMENTS CANNOT BE OVERLOOKED WHEN ONE EVALUATES THE ADVERSE ENVIRONMENTAL IMPACTS ASSOCIATED WITH A REMEDIAL ACTION.

SINCE THE TEMPORARY ENVIRONMENTAL IMPACTS ASSOCIATED WITH DREDGING THE SEDIMENTS IN EAST FOUNDRY COVE MARSH AND EAST FOUNDRY COVE CAN BE CONTROLLED AND MITIGATED, THE CLEANUP EFFORTS SHOULD BE TOWARD TO ACHIEVING THE REMEDIAL OBJECTIVES.

PAGE 18 INCREASING THE CLEANUP LEVEL FROM 100
PARAGRAPH 2 MG/KG TO 900 MG/KG WILL CERTAINLY REDUCE THE AREA OF METAL-CONTAMINATED SEDIMENT TO BE DREDGED AND THE DEGREE OF TEMPORARY DISTURBANCE OF DREDGING TO THE ENVIRONMENT. HOWEVER, THE POTENTIAL LONG-TERM ENVIRONMENTAL IMPACTS IN THOSE AREAS HAVING SEDIMENTS CONTAMINATED WITH METAL CONCENTRATION OF 100 TO 900 MG/KG SHOULD NOT BE NEGLECTED EITHER.

HOW CAN ONE PROPOSE PARTIAL DREDGING WHEN THEIR CONSULTANT STATES THAT THIS IS UNACCEPTABLE? IF REMEDIATION IS PROPOSED TO LEVELS ABOVE 900 MG/KG, THEN MORE THAN THE CHANNELS WILL HAVE TO BE DREDGED. DATA FROM KNEIP ET AL. 1979, AND ACRES 1985 INCLUDE CONTAMINATION ABOVE 1000 PPM MORE THAN 100 FT OFF THE OUTFALL CHANNEL.

PAGE 18 "THE MAXIMUM CADMIUM REMOVAL PER CUBIC
PARAGRAPH 3 YARD" SHOULD NOT BE USED AS THE CRITERION TO DEFINE A CLEANUP LEVEL IN A RI/FS. ADVERSE ENVIRONMENTAL EFFECTS OF A DREDGING OPERATION WOULD BE OF CONCERN IF THEY ARE LONG-TERM IN NATURE AND CANNOT BE CONTROLLED AND MITIGATED.

PAGE 19 DURING THE FIELD SURVEYS OF THE RI, THE
PARAGRAPH 1 WATER DEPTH WITHIN THE EXISTING CHANNELS WERE LESS THAN 2 FEET WHICH IS NOT ADEQUATE FOR THE DREDGING OPERATION. THEREFORE, DIKING AND FLOODING WOULD STILL BE NEEDED. THE DIKING PROPOSED IN THE SUPPLEMENTAL FS REPORT FOR EAST FOUNDRY COVE MARSH DREDGING OPERATION WOULD NOT SIGNIFICANTLY CHANGE THE FLOW PATTERNS WITHIN AREA I BECAUSE ONLY A SMALL FRACTION OF THE TIDAL EXCHANGE WATER ENTERS THE EAST FOUNDRY COVE MARSH AREA. THIS FACT WAS EXPLAINED TO THE PRP'S AND ERT DURING THE SEPTEMBER 18, 1986 MEETING AT EPA REGION II OFFICE. EXPLAINED ALSO IN THE MEETING, THE STAGE-TYPE (I.E., CELL-BY-CELL) DREDGING OPERATION WITH SILT CURTAINS WOULD BE IMPLEMENTED IN EAST FOUNDRY COVE. FOR THESE REASONS, TIDAL FLOWS TO AND FROM CONSTITUTION MARSH WOULD PRACTICALLY NOT BE AFFECTED AT ALL BY DREDGING OPERATIONS IN QUESTION. WITH CLEANUP LEVEL OF 100 MG/KG, ONLY 21 ACRES OF THE TOTAL 34 ACRES OF THE EAST FOUNDRY COVE WOULD BE DREDGED. AS POINTED OUT IN THE PREVIOUS RESPONSE, "COMPLETE REMOVAL" AND "PARTIAL REMOVAL" WERE TERMS USED IN THEIR RELATIVE SENSE IN THE SUPPLEMENTAL FS REPORT.

PAGE 19 THE EXISTING CONDITIONS AND DISTRIBUTIONS
PARAGRAPH 2 OF SEDIMENT CONTAMINATION IN AREA I DO NOT SUPPORT THE THINKING THAT THERE WOULD BE GREAT POTENTIAL FOR THE CONTAMINATED SEDIMENTS TO TRANSPORT TO THE CHANNEL AREA AFTER THE SEDIMENT IN THE CHANNEL AREA HAS BEEN DREDGED.

PAGE 20 "THE CADMIUM REMOVAL PER CUBIC YARD"
PARAGRAPH 1 SHOULD NOT BE USED AS THE CRITERION TO DEFINE A CLEANUP LEVEL IN A RI/FS. THE RI/FS SHOULD PRESENT THE REMEDIAL ALTERNATIVES WHICH CAN ACHIEVE THE REMEDIAL OBJECTIVES.

TED KNEIP'S COMMENTS ON RI RISK ASSESSMENT

PAGE 1 THE FOLLOWING CITATIONS ADDRESS SEDIMENT TO

PARAGRAPH 4 ANIMAL TRANSFER OF METALS:

(1) GUTHRIE, R.K., E.M. DAVIS, D.S. CHERRY, AND H.E. MURRY 1979. BIOMAGNIFICATION OF HEAVY METALS BY ORGANISMS IN A MARINE MICROCOSM. BULL. ENVIRON. CONTAM. TOXICOL. 21:53-61.

(2) GREIG, R.A., P.R. WENZLOFF, A. ADAMS, B. NELSON, AND C. SHELPUK. 1977 TRACE METALS IN ORGANISMS FROM OCEAN DISPOSAL SITE OF THE MIDDLE EASTERN UNITED STATES. ARCH. ENVIRON. CONTEMP. TOXICOL. 6:395-409.

(3) WEZLOFF, D.R., R.A. GREIG, A.S. MERRIL, AND J.W. ROPE 1979. A SURVEY OF HEAVY METALS IN THE SURF CLAM, SPISULA SOLIDISSIMA AND THE OCEAN QUAHOG, ARCTICA ISLANDICA OF THE MID-ATLANTIC COAST OF THE UNITED STATES. FISH BULL. 77:280-285.

THE RISK ASSESSMENT ALSO INCLUDED DATA FROM OTHER STUDIES; ACRES 1985, SLOAN AND KARCHER 1984. AS FAR AS IMPLANTED CRABS NOT SHOWING AS GREAT A LEVEL AS NATIVE CRABS, THE IMPLANTED CRABS WERE IN FOUNDRY COVE FOR ONLY 17 DAYS. RECENT LITERATURE SUGGESTS THAT 30 TO 60 DAYS ARE REQUIRED TO REACH EQUILIBRIUM BETWEEN AQUATIC ANIMAL TISSUES AND CADMIUM IN THE ENVIRONMENT.

PAGE 2 THE INTENT OF OUR REMEDIAL EFFORT IS NOT TO
PARAGRAPH 1 CORRECT THE PROBLEMS OF THE ENTIRE HUDSON ESTUARY. NYSDEC IS PUSHING FOR CLEANUP OF THE FOUNDRY COVE AREA TO BACKGROUND CADMIUM LEVELS BASED ON THE ENVIRONMENTAL CONSEQUENCES OF LEAVING THE SITE ALONE.

PAGE 2 NO MODELS ACCURATELY PREDICT ACTUAL ANIMAL
PARAGRAPH 2 CONCENTRATIONS OF HAZARDOUS SUBSTANCES. ALTHOUGH FISH AND CRABS ARE CAPABLE OF EXCRETING CADMIUM WHEN EXPOSURES ARE LOWERED, THE AVAILABLE SCIENTIFIC LITERATURE INDICATES THAT IT TAKES FROM 90 TO 398 DAYS FOR AQUATIC ANIMALS TO EXCRETE ACCUMULATED CADMIUM.

PAGE 2 WE AGREE THAT REMOVAL OF SEDIMENT FROM ONLY
PARAGRAPH 3 A PORTION OF THE COVE WOULD RESULT IN THE EVENTUAL REESTABLISHMENT OF THE SAME CADMIUM CONCENTRATION CONTOURS BY RESUSPENSION, RAINFALL EROSION AND TIDAL TRANSFER. THEREFORE THE MARATHON BATTERY COMPANY AND GOULD INC. PROPOSAL TO DREDGE ONLY THE HOT SPOTS IN THE CHANNEL IS FROUGHT WITH DANGER, AND UNLIKELY TO BE SUCCESSFUL.

THE 30 YEAR MONITORING PROGRAM WILL EXAMINE THE EFFECTS OF CONTAMINATION LEFT IN CONSTITUTION MARSH ON THE EAST FOUNDRY COVE AREA. WE HAVE NEVER STATED THAT THIS LOCAL REMEDIATION COULD BE EXPECTED TO IMPROVE THE CONTAMINATION OF CRABS IN OTHER LOCATIONS SUCH AS HAVERSTRAW BAY.

(ATTACHMENT)
TABLE 1

ESTIMATED CHRONOLOGICAL CADMIUM LOADING AND ALLOCATION

PERIOD	CADMIUM MATERIAL BALANCE						
	WASTE (LB)	COVE %	BYPASS (LB)	SOLUBLE (LB)	NET LOAD (LB)	OWNER	OPERATOR
1953	20,000	10	2,000	50	1,950	U.S. CORPS	SONOTONE
1954	17,000	10	1,700	50	1,650	U.S. CORPS	SONOTONE
1955	17,000	10	1,700	50	1,650	U.S. CORPS	SONOTONE
1956	12,600	10	1,260	25	1,235	U.S. CORPS	SONOTONE
1957	12,600	10	1,260	25	1,235	U.S. CORPS	SONOTONE
1958	28,160	10	2,816	50	2,766	U.S. CORPS	SONOTONE
1959	28,160	10	2,816	50	2,766	U.S. CORPS	SONOTONE
1960	29,960	10	2,966	50	2,916	U.S. CORPS	SONOTONE
1961	14,080	10	1,408	50	1,358	U.S. CORPS	SONOTONE
'62 TO AUGUST	10,560	10	1,056	37	1,019	U.S. CORPS	SONOTONE
SEPT '62 TO '63	23,520	10	2,352	63	2,289	SONOTONE	SONOTONE
1964	22,000	10	2,200	50	2,150	SONOTONE	SONOTONE
'65 TO NOV	22,000	10	2,200	46	2,154	SONOTONE	SONOTONE
DEC '65 TO '66	38,780	100	38,780	504	38,276	SONOTONE	SONOTONE

1967	21,440	100	21,440	500	20,940	SONOTONE	SONOTONE
1968	16,880	100	16,880	500	16,380	CLEVITE	CLEVITE
'69 TO JULY	9,080	100	9,080	290	8,790	CLEVITE/ GOULD	CLEVITE/ GOULD
AUG '69 TO '70	29,040	TREAT	3,630	710	2,920	MARATHON	MARATHON
'71 TO NOV	22,000	TREAT	460	460	0	MARATHON	MARATHON
NOV '71 TO NOV '80	N/A	0	0	0	0	MARATHON	MARATHON
NOV '80 TO PRESENT	N/A	N/A	-	-	-	MERCH DYNAMICS	MERCH DYNAMICS
					112,444.		

(ATTACHMENT)
TABLE 2

RELATIVE LOADING BY OWNER/OPERATOR

OWNER/OPERATOR	CADMIUM LOADING (LB)	% OF TOTAL
U.S. CORPS/SONOTONE	18,545	16.5
SONOTONE	65,809	58.5
CLEVITE-GOULD	25,170	22.4
MARATHON	2,920	2.6
	112,444	100.0.

(ATTACHMENT)
TABLE 3

DISPERSION INTO AQUATIC ENVIRONMENT

YEAR	LOADING (LBS)	LOSS: SOLUBLE (LBS)	LOSS: DISPERSION (LBS)	NET (LBS)
1953	2,000	50	49	1,901
1954	1,700	50	89	3,462
1955	1,700	50	128	4,984
1956	1,260	25	155	6,064
1957	1,260	25	182	7,116
1958	2,816	50	247	9,635
1959	2,816	50	310	12,091
1960	2,966	50	375	14,632
1961	1,408	50	400	15,590
'62 TO AUG	1,056	37	274	16,335
SEPT '62 TO '63	2,352	63	619	18,005
1964	2,200	50	504	19,651
'65 TO NOV	2,200	46	500	21,305
DEC '65 TO '66	38,780	504	1,614	57,967
1967	21,440	500	1,973	76,935
1968	16,880	500	2,333	90,982
'69 TO JULY	9,080	290	1,455	98,317
AUG '69 TO '70	3,630	710	3,585	97,652
'71 TO NOV	460	460	2,238	95,414
NOV '71 TO AUG '72	0	0	1,988	93,426
SEPT '72 TO JULY '73	(12,000)	0	1,866	79,560
JULY '73 TO '74	0	0	2,818	76,742
1975	0	0	1,305	75,438
1976	0	0	604	74,834
1977	0	0	599	74,236
1978	0	0	594	73,642
1979	0	0	589	73,053
1980	0	0	584	72,468
1981	0	0	580	71,888
1982	0	0	575	71,313
'83 TO JULY	0	0	571	70,743.

TABLE 2
HYDROLOGIC SOIL GROUPS

HYDROLOGIC GROUP	SOIL SERIES	INFILTRATION/RUNOFF CHARACTERISTICS
A	A, B	SOILS HAVING HIGH INFILTRATION RATES, EVEN WHEN THOROUGHLY WETTED; CONSISTING CHIEFLY OF DEEP, WELL- TO EXCESSIVELY DRAINED SANDS OR GRAVEL OR BOTH. THESE SOILS HAVE A HIGH RATE OF WATER TRANSMISSION AND WOULD RESULT IN A LOW RUNOFF POTENTIAL
B	C, D, E, F	SOILS HAVING MODERATE INFILTRATION RATES WHEN THOROUGHLY WETTED, CONSISTING CHIEFLY OF MODERATELY DEEP TO DEEP, MODERATELY WELL TO WELL-DRAINED SOILS WITH MODERATELY COARSE TO MEDIUM TEXTURES. THESE SOILS HAVE A MODERATE RATE OF WATER TRANSMISSION
C	NONE	SOILS HAVING SLOW INFILTRATION RATES WHEN THOROUGHLY WETTED, CONSISTING CHIEFLY OF (1) SOILS WITH A LAYER THAT IMPEDES THE DOWNWARD MOVEMENT OF WATER, OR (2) SOILS WITH MODERATELY FINE TO FINE TEXTURES AND A SLOW INFILTRATION RATE. THESE SOILS HAVE A SLOW RATE OF WATER TRANSMISSION
D	F, G	SOILS HAVING VERY SLOW INFILTRATION RATES WHEN THOROUGHLY WETTED, CONSISTING CHIEFLY OF (1) CLAY SOILS WITH A HIGH SWELLING POTENTIAL, (2) SOILS WITH A HIGH PERMANENT WATER TABLE, (3) SOILS WITH A CLAYPAN OR CLAY LAYER AT OR NEAR THE SURFACE, AND (4) SHALLOW SOILS OVER NEARLY IMPERVIOUS MATERIALS. THESE SOILS HAVE A VERY SLOW RATE OF WATER TRANSMISSION

SOURCE: MODIFIED FROM USSCS, 1979.

TABLE 5
COMPOSITE WATER SAMPLES FROM
EAST COVE TRESTLE - OCTOBER 25, 1984

TIDE STAGE		CD CONCENTRATION (MG/L) TOP	BOTTOM
HIGH SLACK	1	LT 0.0005	0.0006
EBB	1	0.0018	0.0021
LOW SLACK	1	0.0013	0.0016
FLOOD	1	LT 0.0005	LT 0.0005
HIGH SLACK	2	LT 0.0005	LT 0.0005
EBB	2	0.0026	0.0024
LOW SLACK	2	0.0050	0.0061

ACRES.

TABLE 11
FEASIBLE GENERAL RESPONSE ACTIONS AND
ASSOCIATED REMEDIAL TECHNOLOGIES

GENERAL RESPONSE ACTIONS	TECHNOLOGY CATEGORIES
NO ACTION	MONITORING, RESTRICTED ACCESS, PUBLIC AWARENESS
CONTAINMENT	CAPPING, SEDIMENT DISPERSION CONTROL
HYDRAULIC CONTROL	TIDAL, RUNOFF
COMPLETE REMOVAL	DREDGING, EXCAVATION
PARTIAL REMOVAL	DREDGING, EXCAVATION
ON-SITE TREATMENT	THERMAL, CHEMICAL, AND PHYSICAL TREATMENT
OFF-SITE TREATMENT	THERMAL, CHEMICAL, AND PHYSICAL TREATMENT
INSITU TREATMENT	CHEMICAL AND PHYSICAL TREATMENT
ON-SITE DISPOSAL	LANDFILL (HAZARDOUS OR NON-HAZARDOUS)
OFF-SITE DISPOSAL	LANDFILL (HAZARDOUS OR NON-HAZARDOUS), OCEAN DISPOSAL
TRANSPORTATION	TRUCK, TRAIN, BARGE, PIPELINE
SITE RESTORATION	MARSH REVEGETATION

EBASCO.

TABLE 13
COMPARISON OF ALTERNATIVES CONSIDERED TO NCP REQUIREMENTS

ALTERNATIVE	NO ACTION	ATTAINS ARAR	EXCEEDS ARAR	OFFSITE DISPOSAL	REDUCES THREAT
ECM-1	X				
ECM-2		X	X (A)	X	
ECM-3		X	X (A)		
ECM-4		X	X	X	
ECM-5					X
CM-1	X				
CM-2		X	X (A)	X	
CM-3		X	X (A)	X	
CM-4		X	X (A)		
CM-5					X

(A) DEPENDING ON THE PERFORMANCE OF THE DREDGING OPERATIONS AND TREATMENT AND DISPOSAL FACILITY EBASCO.

TABLE 15
SUMMARY OF ANNUAL OPERATIONS AND MAINTENANCE COST ESTIMATES
(1986 DOLLARS)

ALTERNATIVES		ANNUAL O&M COST ($1000/YR)	OPERATION AND MAINTENANCE DURATION (YEAR)
EAST FOUNDRY COVE MARSH (ECM)			
ECM-1	NO ACTION	54	1-30
ECM-2	HYDRAULIC DREDGING/THICKENING	3,430	1 YEAR
	FIXATION/OFF-SITE DISPOSAL	80	2-5
		27	6-30
ECM-3	HYDRAULIC DREDGING/THICKENING	3,184	1 YEAR
	FIXATION/ON-SITE DISPOSAL	137	2-5
		84	6-30
ECM-4	HYDRAULIC DREDGING/THICKENING	778	1 YEAR
	DEWATERING OFF-SITE DISPOSAL	80	2-5
		27	6-30
ECM-5	CONTAINMENT	200	1-5
		148	6-30
CONSTITUTION MARSH (CM)			
CM-1	NO ACTION	100	1-30
CM-2	HYDRAULIC DREDGING/THICKENING	8,806	1-2
	FIXATION/OFF-SITE DISPOSAL	499	3-5
		79	6-30
CM-3	HYDRAULIC DREDGING/THICKENING	1,768	1-2
	DEWATERING/OFF-SITE DISPOSAL	499	3-5
		79	6-30

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